THE RUBBER AGE

ESTABLISHED 1917

COVERS ALL PHASES OF THE PRODUCTION AND MARKETING OF CRUDE RUBBER AND THE MANUFACTURE AND DISTRIBUTION OF RUBBER GOODS

Vol. 36 NOVEMBER, 1934 No. 2

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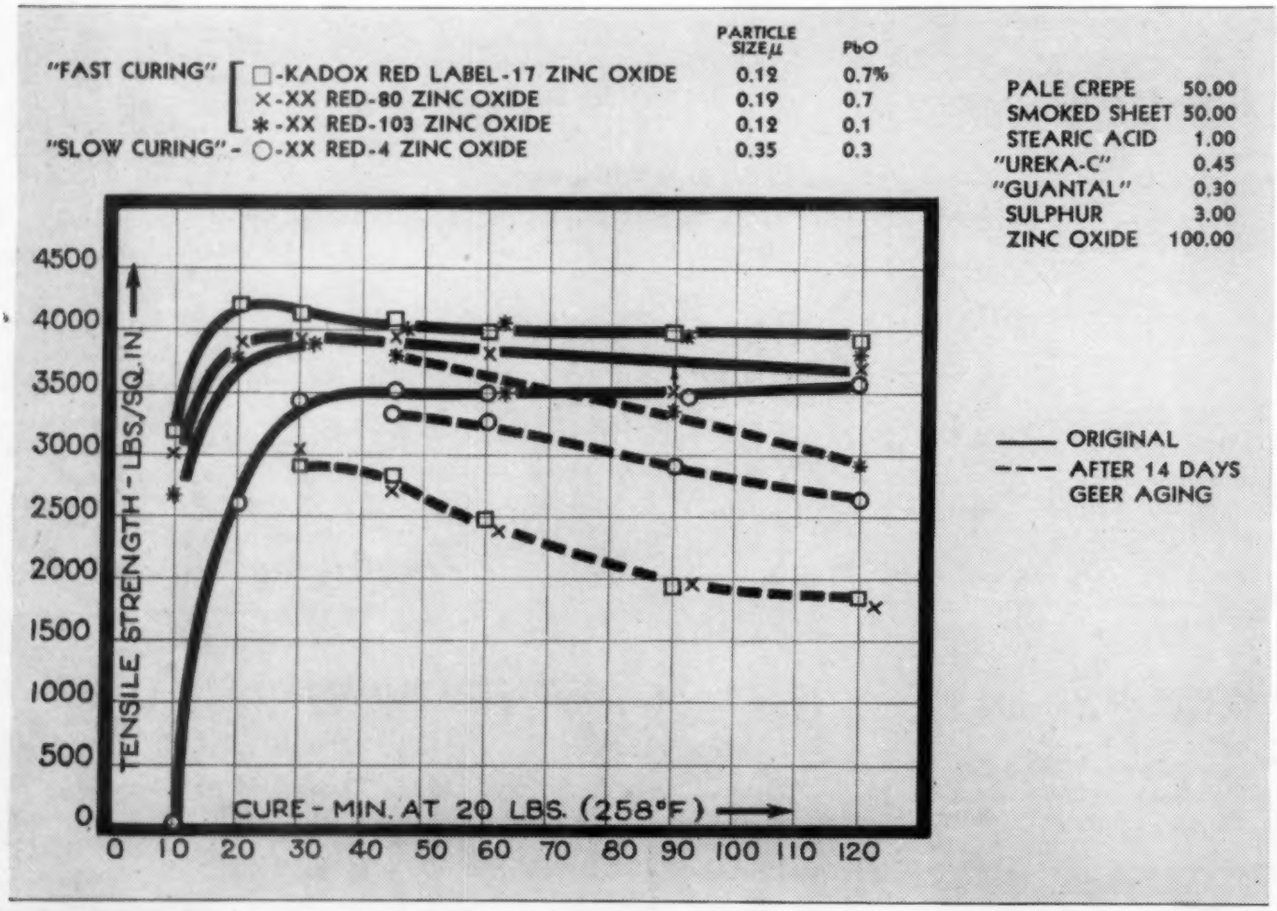
No. 32 of a series of charts showing a comparison of "FAST" and "SLOW" curing zinc oxides with typical accelerators.



New Jersey zinc

THE NEW JERSEY ZINC COMPANY

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Package Standardization

United States Rubber Company Develops a Uniform Plan for the Packaging of Its Thousands of Varied Items

PROPER PACKAGING affords a means of reducing costs and at the same time creating a more salable package. The United States Rubber Company three years ago began a study of the packaging of its thousands of products. These are distributed in almost every conceivable kind of a package such as burlap bags, corrugated shipping containers, solid fibre shipping containers, fibre drums, wire bound boxes, ply-wood boxes, solid pine shipping cases, metal pails and drums and wooden reels. Many of these in turn contain folded or set-up cartons, paper bags, display containers, bottles, collapsible tubes, fibre reels, metal spools and some items merely wrapped in paper or transparent cellulose.

Up to 1931 there had been no definite method or standard either by color, design or style in any one department, let alone a common plan for all the different departments of which the company is made up. Today an orderly procedure has been developed by which all company packaging is controlled. When packages are changed or new packages added they are thoroughly scrutinized, not only by the Sales Department from the standpoint of pleasing design and salability, but by the Production Department from the standpoint of ease in packaging and handling, and the Purchasing Department from the standpoint of cost, practical shipping and adherence to company standards.

The 23 sizes of set-up boxes for U. S. Rubber's hospital and sick room items used 23 differently sized labels. These were reduced to 6 standard size labels and cover paper on all boxes changed to a pleasing plaid design of blue and white

Before any expense is incurred for changes or new packages a "packaging request" must be filled out, signed by the Sales Manager of the division involved, the Production Manager of the plant involved, the Purchasing Agent of the plant involved, the Chairman of the Packaging Committee and the Division Purchasing Agent in charge of Packaging for the company.

Because of the number of producing factories and multitudinous lines of merchandise, it was decided to study the problem of packaging at each plant and the following features were kept foremost in the study made:

1st—Standardization of style and attractiveness of design.

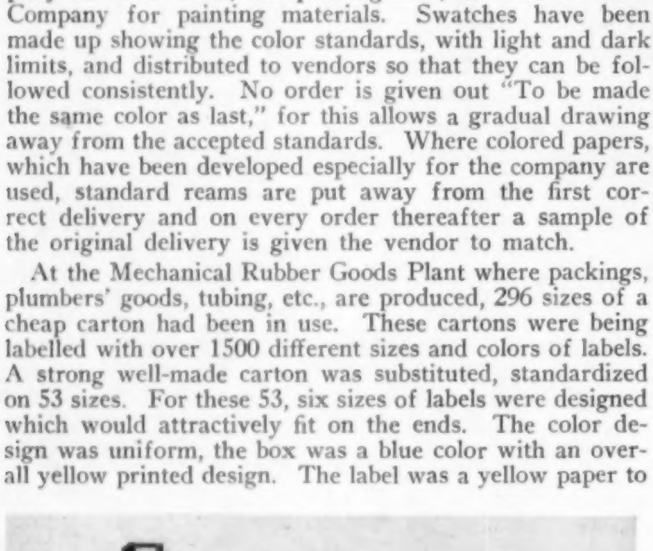
2nd—Simplification and reduction in the number of like packages.

3rd—Reduction of cost.

It is interesting to note that even where the cost of some individual packages seemed likely to be increased because of improvement in the design or style of package to be purchased, a reduction of total cost was almost bound to result because of the standardization of units and simplified specifications of material and design.

The first step was the setting up of a color standard. This was done in preference to a standard design because of the large number of different sizes and styles of packages. A distinctive dark blue and lemon yellow were chosen for all first line products. This selection was made after considerable study, including conferences with experts. Valuable cooperation was given by the International Printing Ink Company, the California Ink Company of New York, for printing inks, and the du Pont Company for painting materials. Swatches have been made up showing the color standards, with light and dark limits, and distributed to vendors so that they can be followed consistently. No order is given out "To be made the same color as last," for this allows a gradual drawing away from the accepted standards. Where colored papers, which have been developed especially for the company are used, standard reams are put away from the first correct delivery and on every order thereafter a sample of the original delivery is given the vendor to match.

At the Mechanical Rubber Goods Plant where packings, plumbers' goods, tubing, etc., are produced, 296 sizes of a cheap carton had been in use. These cartons were being labelled with over 1500 different sizes and colors of labels. A strong well-made carton was substituted, standardized on 53 sizes. For these 53, six sizes of labels were designed which would attractively fit on the ends. The color design was uniform, the box was a blue color with an overall yellow printed design. The label was a yellow paper to match the over-all design and was printed in blue to match the color of the box. The boxes are carried in the flat, when needed they are made up and the labels are printed as production orders are received. No stock of labels is carried and only a minimum stock of boxes. The saving runs into thousands of dollars per year. For second line and private brand products a black box is used with a blue and white or black and white label in the standard sizes.



Metal-edge cartons, standardized on 53 sizes, replaced 296 different sized cartons in the Mechanical Rubber Goods Plant of U. S. Rubber.

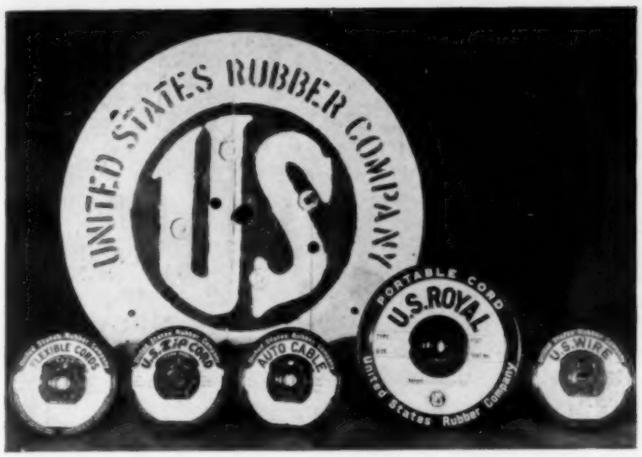
Folding cartons in many styles and sizes to contain flush tank balls, friction tape, jar rings, jar wrenches, washers, bumpers, etc., have been standardized for like items as to sizes, thickness of board and color of printing. This allows, of course, the standardization of shipping containers in such constructions as may be required. Savings will multiply all down the line.

At the wire plant, large wooden cable reels had been used, the only painting on them being the company name and address. Paper spools had been used for small units in a large number of sizes. Cable reels are now painted in standard blue and yellow colors, which not only prolongs their life but is good advertising and makes them look much more attractive. The many sizes of paper spools were replaced with a lithographed metal spool in the blue and yellow color standard, and the number of flange sizes reduced to two, these are purchased separately from the barrel so that whatever quantity of wire is to be applied, the spool can easily be made up at the plant. This reduced the inventory of spools by a large percentage.

Several of the standard packages, of blue and yellow design, adopted for the company's automobile accessory line are reproduced above.

At another plant a line of 23 sizes of set-up boxes was being used for hospital and sick room items sold through drug stores. These boxes each had an individual label. The boxes were covered with a design of paper which upon investigation was found to affect the eyes, making the boxes hard to look at and, therefore, deterring anyone from trying to read the labels on the boxes. The cover paper has been changed to a pleasing plaid design of blue and white which it is felt is particularly adaptable to drug store and hospital items. In place of the 23 sizes of labels a set of 6 has been designed which will fit neatly the 23 boxes.

Many individual items have been studied, redesigned and repackaged. The guiding principle is always the color standard and simplification of design, as this always in-



Varied sizes of paper spools used at the U. S. wire plant were replaced with blue and yellow lithographed metal spools in two flange sizes.

creases the possibility of interchangeability and use of shipping containers for different products. At each plant a survey has been conducted in connection with shipping containers both from a size and construction standpoint. At one plant the company eliminated practically 25 per cent of the sizes used. At another plant corrugated shipping containers were substituted for solid fibre containers, the freight saving because of reduced weight alone amounting to $8,000 per year. The company has given up almost entirely the use of wooden cases.

The Advertising Department has cooperated to the extent of using standard colors on signs used by dealers. Auto trucks owned by the company are now being painted with the standard blue and yellow colors and, where feasible, with the same design. On railway tank cars in which rubber latex is shipped, while aluminum is used as a protective base, paint is used on the metal, the company's name is painted in the standard blue and the company's seal in the standard blue and yellow. All along the line, from freight cars to tying twine, there is adherence to the standard color procedure. Prominent on every package is the standard U. S. Rubber trade mark and name, which always appears in its own distinctive type.

Four points in a work of this kind are necessary:

1.—Standards of either color, style, design or size or a combination of some of these.

2.—Specifications of purchase rigidly adhered to.

3.—Inspection of all material.

4.—Appointment of some one, preferably in the Purchasing Department, whose job it is to see that no expense is incurred for any packaging unless the first three points are being covered. Such a job is one of everlasting watchfulness.

The United States Rubber Company believes that in spending almost $2,000,000 a year for packaging material the money should be carefully spent and full value in design and quality should be received.

Gel Rubber Hydrocarbon

MUCH OF THE available information about rubber has been obtained by considering rubber as a whole and by studying it without regard to the possibility of its being a mixture of chemical compounds. Because rubber is used industrially in bulk, without separation into possible fractions of different composition, such information is of great technical assistance to manufacturers, as witnessed by the improvement in the quality of rubber goods in recent years. However, reports the National Bureau of Standards, in its October *Technical News Bulletin* (No. 210), another factor should be considered.

For instance, in scientific work, or even in technical applications, nobody would attribute to a mixture of salt and soda the properties of salt alone. Similarly, evidence is accumulating that rubber is not a single substance like salt, but is composed of at least two different substances, and is therefore analogous to a mixture of salt and soda. One of these substances, which dissolves in ethyl ether and is therefore called "sol" rubber was described in the *Journal of Research* for April, 1933 (RP544). The second substance, known as "gel" rubber, does not dissolve in ethyl ether in the absence of oxygen. Its preparation and some of its properties are described in RP719 in the October number of the *Journal*.

The gel fraction of rubber hydrocarbon is insoluble in ether, presumably because of its complex structure and high molecular weight. In the presence of a trace of oxygen, the gel becomes soluble in suitable organic liquids. The dissolved gel has been crystallized from a dilute solution at low temperatures and the crystals have been examined. The refractive indices, $\epsilon = 1.535$ at —5° C, and $\omega = 1.583$ at —5° C, are very close to the values previously found for crystals of ether-soluble hydrocarbon.

The melting temperatures, which lie between approximately —5° C and +14° C, depend upon the history of the sample and indicate that the crystals are solid solutions, probably of many closely related components. Crystals obtained from the ether-soluble fraction melted consistently at 10° C. As witnessed by micromanipulation below their melting temperature, the gel crystals contrast sharply in elasticity with crystals of sol rubber. The former appear to be elastic, the latter are plastic.

Also, after the crystals are melted, as indicated by their loss of birefringence, the gel is more resistant to deformation than the sol. Crystals of ether-soluble rubber have been vulcanized below their melting point by means of sulphur chloride. The shape of the crystals remains unchanged, but birefringence, the optical evidence of crystallinity disappears, and their resistance to deformation is increased.

Vulcanization and Stress-Strain Behavior

In the manufacture of vulcanized rubber products, the raw rubber chiefly used is the species called *Hevea brasiliensis* which grows wild in South America and is extensively cultivated in the Far East. In a method of purification which was developed at the Bureau and which is described in RP720 in the October number of the *Journal of Research*, *Hevea* rubber is separated into 2 parts by ethyl ether. One part dissolves and the other does not.

After separating them, the ether was removed from each portion of the rubber and each was mixed with sulphur and other suitable ingredients, including a slow accelerator of vulcanization, and vulcanized. A sample of the original rubber was vulcanized also. Vulcanized rubbers, prepared from the insoluble portion of the rubber were less extensible, and those prepared from the soluble rubber more extensible, than the vulcanized original rubber. These results were confirmed by using two other methods of vulcanization.

Status of the Rubber Industry: A Review

A STRONG upward trend characterized movements in the rubber goods industry during the first half of the current year. The mechanical division was operating on expanded schedules, reflecting the higher rate of activity in most industrial plants, which called for replacements of belting, hose, and packing. Retail departments were benefited by increased pay rolls and auspicious weather conditions, an important factor in this division, as well as by the enlarged demand for automobile tires. Considerable rain during the Spring months was conducive to the movement of raincoats and rubbers, and during the Summer rubber bathing specialties and vacation novelties sold actively.

During the latter part of July, however, a reversal of this trend developed and in the three months that followed sales in practically all departments declined about 15 per cent, as compared with the 1933 levels, and about 10 per cent by comparison with the volume transacted during the earlier months of the year. The gains which were accumulated during the first half of the year, however, were of sufficient proportions to offset the losses of recent months, and both retailers and manufacturers expect to round out 1934 with volume averaging 20 to 25 per cent in excess of that set down for 1933.

Many Losses Eliminated

In contrast to losses in 1933, many of the large rubber companies showed a net profit on their operations during the first six months of 1934. The future is viewed with renewed confidence, owing to the increase in the number of automobiles scheduled for production next year and the almost assured upturn in industrial activity. Besides, the general widening of purchasing power will result in a greater volume of sales in the specialties division, according to a survey of the rubber goods industry, which has just been completed by Dun & Bradstreet, Inc.

During the first five months of the current year, plant activity throughout the industry averaged nearly 50 per cent higher than during the comparative period of 1933, with the movement of mechanical goods stimulated by the widening needs of varied industries. Manufacturers of Summer sport goods were kept well occupied until the end of June, but the output of staples in footwear, drug sundries, hose and hose belting started to recede during the second quarter, with the dullness accentuated in the third quarter. While shipments of rubber clothing to the end of June ranged 35 to 45 per cent higher than a year ago, the decline in both output and orders was abrupt during the Summer months.

Although operations commenced a moderate upturn in August, with some plants running a full single shift, schedules since July have not equalled those of 1933. Manufacturers of mechanical rubber goods have been benefited by the improvement in the automobile industry, and rubber specialty manufacturers have been better occupied since the early part of September.

Production and shipments of automobile tires during the eight months of the current year showed a moderate increase over the figures for the corresponding period of 1933, due almost entirely to the enlarged demand in the first four months. The output of tires each month since May has lagged behind the figures for the comparative month a year ago, and in July fell to 3,353,000 casings, which was a decline of 41.3 per cent from the 5,714,000 produced in July, 1933, and 7.3 per cent under the reduced total of July, 1932.

The peak month for this year in production was in March, when the total rose to 5,180,000, according to statistics compiled by the Rubber Manufacturers' Association. This represented an increase of 19.5 per cent from February, and 154.2 per cent over March, 1933, and was the largest output recorded since August, 1933.

As sales have been exceeding the curtailed output, inventories of tires at the end of July had been reduced to 9,437,000. When compared with the peak of the last four years, which was reached at the end of April, this represented a drop of 21.2 per cent, and was the lowest total that has appeared on the records since December, 1933.

The tire prices remained firm during recent months, following the advances in January and May, which carried the average retail level about 10 per cent above that of 1933. On November 1, however, the leading tire manufacturers made the announcement that had been long expected regarding prices increases. The new list is 5 to 25 per cent higher, depending on the type and brand and on locally prevailing trade practices, with tubes to be advanced proportionately in each class. This action marks the first unified move by the industry for important price improvement since July, 1933.

Manufacturers stated that the step had been forced by recent increases in costs of production, cotton prices being 135 per cent above the low level of the depression, rubber prices 400 per cent, and wages 27 per cent. In addition, the former straight 15 per cent discount allowed the trade has been reduced. By this reduction and the elimination of some special selling bonuses, plus the list price increase, the net return on tires to the manufacturers, whose advances are 5 to 14 per cent, is estimated to have been raised by approximately 18 per cent. (See news story on page 81.)

In spite of some recessions which occurred during the dull selling period of the last few months, prices on industrial rubber goods, footwear, clothing, and sundries, have been fairly well stabilized at a level ranging from 20 to 35 per cent higher than a year ago. As a result of the action of tire manufacturers, advances in these divisions may be forthcoming before the close of the year, although much will be dependent on the crude rubber quotations, which broke sharply following the failure of an agreement to be reached at the London conference recently on the restriction plans for 1935 rubber exports. (The quota has since been set at 75%—Editor.)

Bankruptcies Reduced

The rubber industry probably stands alone for the extent of the reduction in bankruptcies which has taken place since March, 1933. The abrupt downtrend which then started resulted in a lowering of the total number of failures for 1933 to 13, which was exactly half the 26 recorded for 1932. The involved liabilities of the defaulting firms was cut even more sharply, as the total of $208,856 compared with $1,438,683 in 1932, a decrease of 85.5 per cent.

As the money lost through bankrupt firms reached an all-time high in 1931 at $1,749,970, the 1933 figures dropped 88.0 per cent under that level. Following the sharp curtailment in 1933, failures have been brought almost to a complete standstill this year. From January to the end of September no failures were recorded for manufacturers of rubber goods and for wholesalers and retailers only 1 default was set down, with involved liabilities of $16,402, which establishes a new low for insolvencies in this industry.

Halogenated Rubber Products

By Frederick Marchionna

Author of "Latex & Its Industrial Applications"

THE FOLLOWING abstracts of United States Patents on halogenated rubber have been compiled by Mr. Marchionna in the course of an investigation of patents on rubber derivatives. In view of the renewed interest in chlorinated rubber within the past few years it is felt that a review of the patents on this subject will be of interest to our readers. Accordingly, abstracts of all the United States Patents—about 70 in number—on chlorinated, brominated and iodated rubber will be published in this and subsequent issues of THE RUBBER AGE. It is planned to incorporate this material into a book at a future date which will be an addition to the author's bibliography, i.e. "Latex and Its Industrial Applications."
—EDITOR'S NOTE.

1.—Engelhard & Havemann; U. S. Pat. 26,175, Nov. 22, 1859; *Chlorinated Rubber.*

Rubber can be bleached by chlorination either in solid form or in solution. When the process is carried with a rubber solution the gum is dissolved in a solvent and a stream of chlorine gas is passed through the solution. During the chlorination the solution begins to turn from a dark to a lighter color, and when sufficient chlorine has been absorbed the solution has a yellow color. The chlorine saturated solution is then heated to a moderate temperature to evaporate the solvent, care being taken that the temperature is below the B. P. of the solvent employed, so as to obtain the solid bleached product. Or, the solution may be treated with ethyl alcohol to precipitate the chlorinated rubber. Whichever way the chlorinated rubber is obtained, it is filtered, washed well, and dried to produce a white, hard mass, which, while stable in certain organic solvents, is not affected by hot water or acids.

2.—Havemann; U. S. Pat. 31,240, Jan. 29, 1861, *Chlorinated Rubber Products.*

Zinc oxide is incorporated in the chlorinated rubber solution of U. S. Patent 26,175 to obtain a good ivory or bone substitute. Any desired quantity may be incorporated, the preferred proportions being 1 part of zinc oxide to 2 parts of solution. The mixture is ground until it is reduced into a soft jelly mass, and alcohol is added thereto to precipitate the chlorinated rubber-zinc oxide mixture. The precipitate is separated from the liquid, and it is then placed between cold zinc plates, or in a press and subjected to gradual increasing pressure until it is well compacted, after which it is heated moderately for 3 to 4 days to completely evaporate the solvent. Several such sheets may be joined into a thick slab by wetting the faces of the sheet with chloroform or other solvents, superimposing several such sheets, and compressing between zinc plates heated with steam. The product may be colored by the addition of pigments to the chlorinated solution, and bone dust, collodion, etc. may be incorporated.

3.—Havemann; U. S. Pat. 31,241, Jan. 29, 1861; *Chlorinated Rubber Products.*

To harden and strengthen the brittle, porous material obtained in U. S. Patent 26,175, there is added lime, ammonia, and ammonium carbonate. After the chlorinated rubber solution is treated with alcohol to precipitate the chlorinated rubber, the latter in the form of a plastic mass is admixed, first with ammonia and ammonium carbonate, using ⅛ dram of each for each pound of rubber, and then there is added ½ pound of lime. The mixture is well homogenized, placed between metal plates, subjected to gradual increasing pressure, and heated to 240°F. for sufficient time to produce a compact, white ivory-like mass which is resistant to grease and acids.

4.—Marquard; Reissue 2,180 (U. S.), Feb. 20, 1866; *Chlorinated Rubber.*

This reissue is from U. S. Patent 51,331, and deals with the chlorination of rubber in solution. Rubber or gutta-percha (2) is dissolved in $HCCl_3$ (32), and the solution introduced in a digester and subjected to chlorine gas until the gum is completely "bleached." This treated solution is transferred in a vessel provided with an agitator, and is washed with hot water while agitating until free of any chlorine or other gases, and the solvent and any water removed by distillation. The process may also be carried out during the washing by raising the temperature of the water to about 176° F. The residual chlorinated rubber is strained, pressed and dried; it is then re-dissolved in a small quantity of a solvent to form a thick paste which is mixed with phosphate of lime or zinc carbonate to produce a dampened meal which is compressed in a hot mold, and the molded mass machined in any required shape.

5.—Granja; U. S. Pat. 72,272, Dec. 17, 1867; *Deodorized Rubber.*

A solution consisting of iodine (15 grains); potassium permanganate (24 grains); potassium iodide (60 grains); glycerine (4 ozs.); sodium sulfite (4 ozs.); calcium sulfite (4 ozs.); potassium sulfite (4 ozs.); and water (1.5—72 gals.) is used to deodorize cured or raw rubber, gutta-percha, etc. The gum is added to the above solution and macerated for about 24 hours in an earthenware vessel, after which the mixture is heated up to boiling until ⅛ of the solution mixture is evaporated. It is then cooled and exposed to a fresh air current until the rubber is completely deodorized, after which it may be perfumed by immersion in an alcoholic aromatic solution of a perfume.

6.—Newbrough & Fagan; U. S. Pat. 73,545, Jan. 21, 1868; *Halogenated Rubber.*

Rubber is treated with a proto-bromide of iodine consisting of equal parts of bromine and iodine. These two halogens, however, are first each combined with turpentine pre-treated with 25% of sulfuric acid, and the two treated halogens then admixed. Three ounces of this mixture is then combined with 1 lb. of rubber, and the mixed mass hardened by heating at 200° to 320°F. for 10 minutes to about 1½ hours.

7.—Newbrough & Fagan; U. S. Pat. 73,916, Jan. 28, 1868; *Brominated Rubber.*

Molded or carved rubber articles are hardened by treating the rubber surfaces with liquid bromine. Usually the article is immersed in the bromine solution and kept in it until the surface becomes hard. The hardening process is controlled by first immersing the rubber article in a solution consisting of $HCCl_3$ (1) and bromine (9), and then immersing it in the liquid bromine. The rubber, however, may be first dissolved in the chloroform-bromine solution, painted on a former to a layer of the required thickness, and the solvent then evaporated to obtain an article of brominated rubber.

8.—Newbrough; U. S. Pat. 84,369, Nov. 24, 1868; *Iodated Rubber Products.*

An iodated rubber which is easily molded is made by combining wolfram or tungsten oxide with the rubber and the

iodine. Thus wolfram (6) is first ground with kaolin (6) and iodine (1) and the mixture then incorporated with rubber (12), and the mass then heated to the hardening temperature.

9.—Helm; U. S. Pat. 115,202, May 23, 1871; *Chlorinated Rubber.*

Rubber is chlorinated with chlorine liquefied under pressure or with chlorine water. Thus rubber in form of sheets or small lumps is immersed in liquid chlorine and kept in the chlorine until for each pound of rubber there are absorbed 12 ozs. of chlorine, when the product has turned into a white, brittle mass. This chlorinated mass is then washed first with an alkali hydroxide solution, then with water, and finally molded into any form at 125° to 212° F. The process can also be carried by dissolving rubber in gasoline or benzene and passing liquid chlorine under pressure, or chlorine water through the solution while agitating it. The chlorinated rubber precipitates into a white powder which is washed and molded as above. Zinc oxide, lime, ground glass, colors, etc. may be added before chlorination.

10.—Lamb; Reissue 9,777 (U.S.), June 21, 1881; *Moth- and Waterproof Material. Reissued from U. S. Patent 224,296.*

A colorless and odorless product is obtained by subjecting rubber to hydrogen chloride resulting from the reaction $2\ NaCl + H_2SO_4 \rightarrow 2\ HCl + Na_2SO_4$. Rubber or gutta-percha (0.25 → 1 oz.) is dissolved in one gallon of naphtha, gasoline, etc., and NaCl (4 lbs.) + H_2SO_4 (4 lbs.) are successively added. The mixture is allowed to stand for 24 hours when the HCl produced will have acted on the rubber to change it into a white product. Compressed air is then blown through the reacted solution to drive off any uncombined gas, and the solution mixture washed with water, which may contain NaOH or NHOH, and allowed to settle. The water which settles at the bottom is drawn off and the upper layer containing the "bleached" gum in solution, which is colorless, is employed to impregnate textile cloth, carpets, tents, ostrich feathers, etc. to render the same moth-proof and waterproof.

11.—Lamb; U. S. Pat. 224,297, Feb. 10, 1880; *Moth- and Waterproofing Material.*

An improvement over reissue patent 9,777 (U.S.) which consists of adding paraffine into the rubber solution before subjecting the same to hydrogen chloride. Thus refined paraffine wax (0.25 to 2 ozs.) is mixed with an equal quantity of rubber and the mixture is dissolved in 2 gals. of a solvent. In a separate vessel there are spread 4 lbs. of NaOH and 40 gals. of the rubber-wax solution added, followed by H_2SO_4 (4 lbs.). The reaction is allowed to occur as prescribed in reissue patent 9,777 (U.S.) and the resulting "bleached" product separated and treated as in the reissue patent. The clear rubber hydrochloride solution obtained is used for impregnating textile fabrics, rugs, feathers, furs, etc. to render the same moth-proof.

12.—Conger; U. S. Pat. 310,560, Jan. 13, 1885; *Chlorinated Products.*

Rubber and paraffine in equal proportions are dissolved in naphthaline, naphtha, benzol, etc. using 2 parts of rubber-wax wth 140 parts of solvent, and treated with chlorine which may be in the form of a gas developed from the reaction $NaCl + H_2SO_4 + MnO_2$. The reagents can be added successively to the solution, or the chlorine gas may be produced from the reactants separately, and injected into the solution. Either way the gas is added to the rubber solution, it is allowed to act on it for 12 to 24 hours until the solution is of dark, brownish hue. The reacted solution mixture is allowed to settle, decanted, and washed with warm water or an alkali hydroxide solution several times until the chlorinated rubber solution is perfectly neutral and in a clear, pellucid state. Such a solution is particularly suitable for proofing fabrics to render same moth-proof and impervious to mildew.

13.—Edison; U. S. Pat. 438,309, Oct. 14, 1890; *Electrical Insulation.*

Balata or gutta-percha is dissolved in a chlorinated hydrocarbon solvent such as chloroform and chlorinated by means of chlorine gas to such a degree that the resulting product is not brittle. To increase the flexibility of a coating layer deposited from the chlorinated balata there may be added a quantity of untreated gum in solution. To insulate an electrical conductor the wire may first be covered with a fibrous layer and then passed into the solution of chlorinated balata. Or, the chlorinated gutta-rubber in solution is heated to evaporate the solvent so as to reduce the product in the form of a plastic putty which is easily extruded over the bare metal conductor.

14.—Scherpe; U. S. Pat. 906,306, Dec. 8, 1908; *Vulcanized Rubber Solution.*

Para rubber (4) is dissolved in carbon tetrachloride and a cold solution consisting of iodine (0.4) in carbon tetrachloride (100) added thereto. The mixed solution is allowed to stand for a long time until it loses its stickiness, when the rubber solution is believed to have been vulcanized by the iodine. The non-sticky iodized solution is particularly adapted for surgical purposes. In fact, after being filtered and sterilized it can be used for covering parts of the human body to be operated, or used as bandage, or for covering the hands of surgeons.

15.—Wildermann; U. S. Pat. 1,022,014, Apr. 2, 1912; *Ebonite Resistant to Halogens.*

An ebonite resistant to the action of halogens is produced by treating rubber with sulfur or chlorine in such a way so that the polyprene molecule $(C_5H_8)n$, having a double bond for each nuclear C_5H_8, (theoretical assumption), will be fully saturated with the chlorine or the sulfur. When chlorine is the hardening agent used, the chlorination should be carried in such a way that only the slow substitution reaction takes place and not the fast one of addition. Details of this procedure are not given, but the detailed process employing sulfur is described.

16.—Peachey; U. S. Pat. 1,234,381, July 24, 1917; *Chlorinated Rubber.*

Rubber is dissolved in a solvent inert toward chlorine and the solution chlorinated with chlorine gas. In the example, rubber (50 grs.) is dissolved in CCl_4 (2500 cc.) and a stream of chlorine gas passed through the solution until about 100 grs. of chlorine have combined with the rubber. Under the treatment it is possible to obtain the rubber heptachloride. Organic fillers, such as camphor, may be added to the solution before or after its chlorination. Inert fillers and pigments may be incorporated after chlorination. The chlorinated solution may be treated with steam for the recovery of the solvent, and the solid product then dried. This solid chlorinated rubber may then be re-dissolved in benzene, toluene, xylene, etc. or mixtures thereof, and the resulting solution used for treating balloon fabrics, wood, metal, leather, paper, etc. Prior to use, and before evaporation of the solvent, the solution may be treated with lime, sodium bicarbonate or similar alkaline substances to neutralize and remove any dissolved acid gas. The chlorinated rubber in solution may be precipitated by the addition of alcohol, petroleum, ether, etc. and the precipitate washed and re-dissolved.

17.—Ostrosmilensky; U. S. Pat. 1,242,586, Oct. 9, 1917; *Vulcanizing Process.*

Rubber chloride or bromide or hydrochloride or hydrobromide is employed for vulcanizing rubber. In one example rubber (10) is combined with brominated rubber (85) and the mixture heated at 130°C. for 2 hours to obtain an ebonite-like product. In another example rubber (1) is mixed with rubber hydrochloride (16.5) and the mass heated as above to obtain a soft vulcanized product. In other examples there are used halogenated synthetic rubber-like products.

18.—Snelling; U. S. Pat. 1,288,723, Dec. 24, 1918; *Chlorinated Rubber.*

Pontianak rubber is macerated with water and rolled into a thin sheet. The sheet, while moist, is subjected to the action of chlorine gas until the rubber has become sufficiently plastic. This chlorinated product is washed with a weak alkaline solution and with water to remove any uncombined chlorine. The product may be used in the manufacture of chewing gum; or it may be dissolved in a suitable solvent and the solution used for coating articles of any kind.

[To be continued]

Diffusion of Water Through Organic Insulating Materials

Tests Make Estimate Possible on Thickness of Rubber and Other Materials Needed to Provide Protection from Water

By D. B. Herrmann

Chemical Laboratories, Bell Telephone Laboratories, Inc.

WATER has remarkable penetrating power. No organic substance is known to be entirely impervious to it. The life of plants and animals may be said to depend on the diffusion of water through their cell walls, and it is a familiar fact that the water which permeates the human body forms its largest single constituent. Water passes through materials often considered water-proof such as rubber, asphalts and waxes.

In the Bell System a number of organic materials are used as insulations which often are exposed to moisture. Although the actual quantity of water which diffuses through most organic substances is small, this small amount becomes important in condensers, coils and terminal boxes and other apparatus which must be protected over a period of years.

One of the methods used to evaluate insulations which are to be exposed to moisture is the measurement of the quantity of water absorbed. Such measurements do not always give a complete picture of water-proofing characteristics, since a considerable amount of water may diffuse through a layer of material into some interior space and only a small amount remain absorbed in the outer layer. Differences in molecular structure, phase relationships, and crystalline state may play important roles in diffusion, and often the absorption of water does not appear to be the principal controlling factor.

Of the general method for determining the rate of diffusion of water through a layer of substance, probably the most simple and direct is to establish on one side a concentration of water vapor, maintain on the other side a lower concentration, and measure the amount of water which passes through the material in a given time. A convenient way to do this is to seal a sheet of the material across a cup or cell in such a manner that moisture passes from the cell through the sample into a drying agent outside. For such measurements several types of cells are used in these Laboratories depending on the nature of the material.

Reprinted from the October, 1934, issue of the Bell Laboratories Record.

FIG. 1—Water vapor passes from the interior of the aluminum cell through the rubber sample into a drying agent outside.

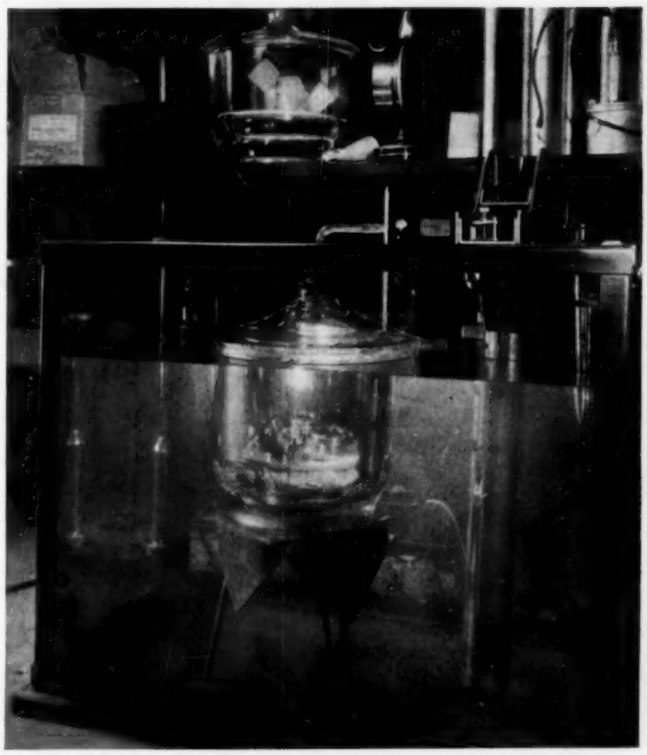


FIG. 2—The temperature is held constant during a diffusion test, often by keeping the cells in a desiccator immersed in a water bath.

For rigid and semi-rigid substances like soft and hard rubber, phenol fibre, cellulose derivatives, and many plastics, an aluminum cell is used in which the sample is held in place by an aluminum pressure ring, the seal being completed by suitable washers coated with petrolatum (Figure 1). The cell is placed in a dessicator containing a drying agent and maintained at 25° C. by immersion in a water bath (Figure 2). The loss in weight of the entire cell combination is taken as the amount of water which has diffused through. Moisture absorbed by the material does not change the total weight.

For substances having a tendency to cold flow, such as asphalts, the cell shown in Figure 3 is used. The asphalt is supported by a thin alundum disc, and the drying agent

is supported on a calibrated quartz spring whose elongation indicates the amount of water which has passed through.

A third type of cell is used for materials having a very low diffusivity and which require an extremely tight seal. Such a cell may be constructed by making a thick-walled

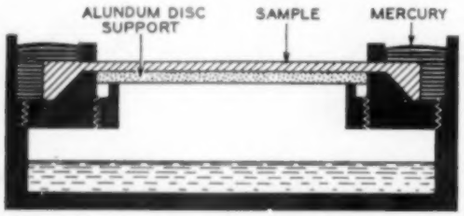


FIG. 3—When a material with a tendency to cold-flow is placed in a diffusion cell, it is usually supported by an alundum disc.

wax cup across the mouth of which a thin disc of the material to be measured may be sealed. The sealing is accomplished by melting together the edges of the cup and the disc, if the disc is of wax, or by melting the cup around the edge of the disc if the latter cannot easily be melted. The water which passes through is collected by a drying agent attached to a calibrated quartz spring, as shown in Figure 4. The temperature is kept constant by placing the apparatus in an air bath or constant temperature room.

Most materials obey quite closely the linear diffusion law established by Fick, and since the factors which enter into linear diffusion are definite and measurable, the law is particularly applicable from an engineering standpoint. It states substantially that the amount of vapor diffusing through a unit area of a material in unit time is proportional to the difference in vapor pressures on the two sides and inversely proportional to the thickness. The constant of proportionality, or diffusivity, constant depends principally on the nature of the material. The law is somewhat analogous to Ohm's law; the differential vapor pressure corresponds to the electromotive force, and the flow of water molecules driven by it is checked by the "resistance" of the material. Diffusivity is thus analogous to conductance.

The diffusivity constant of a material is taken as the number of grams of water which pass through a one centimeter cube in one hour under a vapor-pressure difference of one millimeter of mercury at a definite temperature.

Organic materials whose diffusivity constants at 25° C.

* *"Sorption," and the corresponding verb, "sorb," describe a process in which both absorption and adsorption takes place.*

FIG. 4—In testing substances having a tendency to cold flow, such as asphalt, the water which passes through is collected by a drying agent attached to a calibrated quartz spring, as shown here.

have been measured in the Laboratories include soft and hard rubber compounds, submarine cable insulations, phenol fibre and similar materials, cellulose acetate and related substances, asphalts, and pure hydrocarbons such as polystyrene. The amount of water which diffuses through a centimeter cube of material at 25° C. ranges between 10^{-9} and 10^{-5} grams per hour when the difference in vapor pressures is one millimeter of mercury (Figure 5).

Measurements of this sort have proved especially valuable in dealing with rubber, asphalts, and waxes, which are used extensively in the Bell System as insulating materials, primarily to provide protection from water. The amount of material needed for protection has hitherto been determined largely empirically, but a knowledge of the rate at which water passes through an insulation now

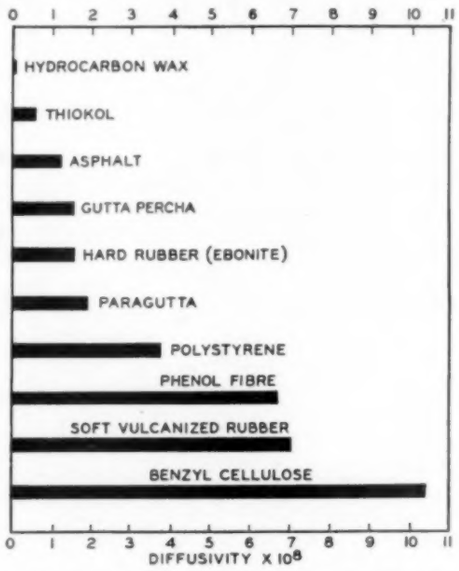


FIG. 5—The diffusivities of organic insulating materials differ considerably. That of cellulose acetate, if plotted on this chart, would appear as a bar extending to 160.

makes it possible to estimate the thickness needed to protect a piece of apparatus for a specified length of time under known conditions of temperature and humidity. The minimum thickness of rubber sheath necessary to protect a dry-core paper cable can be calculated, for example, and the amount of material required in sealing apparatus with an organic substance can be estimated.

The mechanism by which water diffuses through solid materials is not definitely known. There are some data on the diffusion of gases through inorganic substances, however, which help to explain similar processes in organic materials.

There are indications that sorption* plays an important part in some cases of the diffusion of gases through inorganic materials. Hydrogen diffuses into copper only after it has first been adsorbed on the copper surface, and palladium sorbs hydrogen so strongly as to indicate that they combine chemically. On the other hand, diffusion independent of adsorption seems to be exemplified by the passage of inert gases through fused silica, where the gas molecules are believed to enter extremely minute cracks in the film directly from the gas phase.

The diffusion of moisture through certain organic substances such as polystyrene and hydrocarbon wax, is associated with very little absorption. The amount of water absorbed by polystyrene is extremely small, although the diffusion of water through it is comparatively large. The

(*Continued on page 78*)

Rubber as a Chemically Resistant Material*

A Treatise on the Characteristics of Rubber from the Standpoint of Its Chemical Resistance

By Dr. D. F. Twiss

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ONE of the major advances of recent years in connection with protection by rubber has been the discovery of new methods for increasing the firmness of attachment of rubber to other surfaces, particularly iron or steel. Most of these methods are effective with soft-rubber coatings, whether formed *in situ* by a latex process or applied as unvulcanized sheet.

Firm attachment of vulcanite to a good surface of carefully cleaned and sand-blasted metal is generally possible without the need of any special device other than possibly applying an intermediate layer of solution of the rubber "compound" to ensure the intimate contact between the rubber and the prepared metal surface; the solvent should be allowed to evaporate before vulcanization.

Many types of material have been proposed as "cements" for soft rubber. A prime coating of ebonite or ebonite solution on the prepared metal has often been applied as an effective method of securing increased firmness of attachment of a soft rubber sheet coating; the effectiveness of the ensuing bond is evident from the degree of attachment of rubber tread to steel band in a solid truck tire. A solution of rubber, containing a high proportion of *p*-nitrosodimethylaniline, applied to the clean metal surface as a first coating, also ensures greatly enhanced strength of adhesion of sheet rubber thereto (B.P. 352,080). Hæmoglobin also has been used, mixed with rubber (conveniently by dissolving in latex), in a primary adhesive layer for rubber to metal attachment.

Another method is the coating of the steel foundation with a film of brass or other copper alloy—the composition is not unimportant—which becomes attached more firmly to the rubber. More recently this has been elaborated into the use of a preliminary application to rubber or metal of a solution of a metallic compound, *e.g.*, a copper soap, one part of the molecule of which provides firm attachment to the steel and the other to the rubber. (B.P. 307,056, also 390,932.)

A further advance has been to render the rubber itself capable of stronger adhesion. This has been done, *e.g.*, by acting on the rubber surface with a halogen or halogen compound before application to the steel. A more satisfactory method still has been to use a new class of adhesive made from rubber (*e.g.*, B.P. 247,136-357,238), or a mixture of natural resins and rubber (B.P. 395,430). When a soft-rubber compound is vulcanized in contact with a steel plate which has first been painted with a solution of an adhesive of this class, the bond between rubber and metal can be actually stronger than the rubber itself. At 100° C. the attachment is weakened, and a maximum temperature near 70° C. is advisable.

As an alternative to attaching rubber to metal it is possible sometimes, *e. g.*, in concrete structures, to provide a special suitable surface to support and hold the rubber lining. The special surface (for tanks of concrete, wood, etc., and even metal) conveniently consists of a hydraulic cement to which latex has been added with or without rubber crumb. The cement holds itself to the foundation on which it is spread and the exposed rubber particles on its surface provide anchorage for the rubber sheet which is subsequently applied (*e.g.*, B.P. 275,316). The attachment can be enhanced by suitable adhesive solutions of or for rubber.

In attaching a sheet of rubber lining to any surface it is doubly important to ensure as perfect a contact and as complete removal of air (and moisture) pockets as possible. Not only will residual pockets be sources of weakness in eventual service but they may also tend to spread during the immediately following vulcanization process.

The availability of powerful ultra-accelerators permits vulcanization to be effected even by filling with water and gradually heating to or near the boiling point. It is an advantage, however, to apply fluid (*e.g.*, air) pressure greater than that of the vapor pressure of water at the temperature of vulcanization to prevent vaporization of accidental traces of moisture and "lifting" of the applied rubber; a greater solidity and more intimate contact are thereby ensured. If vulcanization is effected above 100° C. it may be important to maintain the auxiliary pressure, especially during subsequent cooling.

Testing

In order to prevent porosity or "pinholes" which would eventually permit seepage of the contents through the protective lining to the metal wall of the container, it is the practice of the rubber manufacturer to build up his unvulcanized sheet (whether for soft rubber or ebonite) from several plies of thinner material.

The insulating character of the rubber lining[2] makes electrical methods of testing convenient. Direct tests as to conductivity between the fluid contents and the metal wall are simple, but exploration of the surface of the lining with a brush discharge up to 20,000 volts (the tank being earthed) is much more satisfactory in all respects. If direct access to the metal is possible, the brush discharge there changes to a spark discharge.

The satisfactory testing of small samples as to resistance, metal-protection, and adhesion is a matter of distinct difficulty and there are no standardized methods. It is essential that the procedure by which such samples are

* *Continued from the October, 1934, issue.*

[2] For an interesting general account of the subject of such linings, see India-Rubber J., International Issue, 1930, Oct. 31, p. 25.

prepared, as well as tested, should approach as closely as possible the large-scale conditions. Even so, interpretation of small-scale tests has to be made with caution.

Improved Rubbers

The compounding of rubber for special purposes is now a highly developed art. It is surprising, nevertheless, that although there are a few ingredients, *e.g.*, graphite, which find little application in rubber for other purposes, most of the ingredients important for chemical engineering purposes are selected from groups well known in connection with other uses of rubber. Fillers which are attacked by acids with formation of soluble products should as far as possible be avoided. The vulcanizing agents (including accelerators) and anti-agers or anti-oxidants are much the same as those used for ordinary rubber manufacture; the particular conditions enable a width of choice and in some cases impose certain restrictions which may not obtain with general manufactures.

Carbon black which is today an indispensable ingredient for rubber intended to withstand heavy abrasive service (*e.g.*, in motor tire treads) is important also in rubber for chemical engineering equipment not only for this reason but also because of its concurrent effect in improving the oil-resistance of rubber. Other forms of "softer" amorphous carbon, *e. g.*, "thermatomic black" however, have an advantage in a less marked hardening of the rubber material. Other methods superior to the use of carbon black for the latter purpose depend rather on the partial replacement of rubber by other plastic materials of lower sensitiveness to oil, *e.g.*, glyptal resins or methyl cellulose, but generally of poorer mechanical strength (cf. Naunton, Jones, and Smith, *Trans. Inst. Rubber Ind.*, 1933, **9**, 169).

By special compounding it is possible to produce soft vulcanized rubbers with exceptional resistance to heat (cf. Booth, *Ind. Eng. Chem.*, 1932, **24**, 555; Somerville and Cope, *Trans. Inst. Rubber Ind.*, 1928, **4**, 263).

Chlorinated rubber, now known under various proprietary names, *e.g.*, duroprene, tornesit, alloprene, has been known for many years as a chemically resistant material, patents for its production having been filed as early as 1859 (B.Ps. 2734, 2762). Many modifications in its method of production and of the characteristics of the product have been described, but the essential procedure for manufacture is the direct addition of chlorine to rubber, the latter being generally in solution. The chemical change is not merely additive, substitution also occurring so that the product may contain over 65% chlorine and approximate to $(C_5H_6Cl_4)_n$. It is surprisingly resistant to acid and alkali and solutions can serve as effective chemically-inert lacquers. It forms hard resistant and uninflammable coatings which, however, are not extensible like rubber. On that account although a thin surface film of chlorinated rubber can offer protection to an under-layer of rubber on which it is formed, mechanical stresses tend to crack the film and impair its action. A shortcoming of chlorinated rubber is its insolubility in ordinary rubber so that it is not possible homogeneously to incorporate one in the other.

This gap somewhat unexpectedly left unsatisfied by chlorinated rubber has lately been partially filled by a new synthetic rubber-like product containing chlorine; it is yet too soon to say how completely the requirements will be fulfilled. The new material DuPrene is a polymerized chloro-butadiene and has the composition $(C_4H_5Cl)_x$.

If by the term "rubber" is meant a material showing the particular set of physical characteristics exhibited by natural rubber, DuPrene, in spite of its composition, is more entitled than any previous chemical product to the description synthetic rubber. It possesses additionally several features of its own, *e.g.*, exceptional resistance to heat, "reclaiming" by heat-treatment being impossible; "vulcanization" without sulphur, only certain catalysts, *e.g.*, magnesium oxide being required; vulcanizability only to the "soft rubbered" condition, no ebonite product being obtainable; much greater resistance than rubber to organic solvents and to gaseous diffusion. It should be noted that with rubber and DuPrene diffusion by gases is essentially a solution process in which gas or vapor enters one surface by dissolving and escapes from the other by evaporation. Despite a peculiar and somewhat unpleasant odor, it is likely that DuPrene will eventually find extended application in chemical equipment. At the present time its uses are limited by the quantity commercially available as well as by price.

DuPrene is not so resistant to organic solvents and oils as ebonite, although superior to rubber in that respect (Hayden and Krismann, *Ind. Eng. Chem.*, 1933, **25**, 1219). Its miscibility with rubber and its incapacity to form an "ebonite" offer the considerably attractive possibility of exhaustive vulcanization of a mixture of DuPrene and rubber whereby the ebonite formed from the latter will be rendered elastic and pliable by the presence of the vulcanized DuPrene while retaining the chemical inertness of ebonite.

The manufacture of DuPrene from acetylene *via* vinylacetylene gives rise also to a by-product (a partly polymerized divinylacetylene) with the features of a drying oil which on account of the permanent character of its dried films offered great possibilities as a synthetic drying oil to give corrosion-resisting coatings. The product (designated S.D.O., CF. Hayden, *Ind. Eng. Chem.*, 1932, **24**, 563) unfortunately had a tendency to undergo spontaneous oxidation to explosive products and on account of its uncertainty in this direction has been withdrawn.

Another synthetic plastic material has been produced commercially of recent years to combat the swelling action of organic solvents. Thiokol (cf. Smith, *Kautschuk*, 1933, **9**, 185) is an ethylene polysulphide made by the interaction of ethylene dichloride and an alkali polysulphide. Its resistance to the solvents which rapidly distend ordinary vulcanized rubber is remarkable only carbon disulphide having any appreciable effect on it. Thiokol does not possess great mechanical strength, but a small proportion of rubber greatly improves it in this feature. Like DuPrene it can undergo mechanical improvement by a "vulcanization" treatment induced by a basic oxide, *e.g.*, zinc oxide and it can be strengthened by compounding with ordinary rubber-compounding ingredients, *e.g.*, carbon black. Its resistance to permanent deformation, however, is less than that of rubber or DuPrene, and it is seriously affected by caustic alkalis. Its odor is distinctly unattractive. Thiokol is resistant not only to most liquid solvents, but also to their vapors so that it can be used to provide an impermeable lining for the covers of gasoline —or naphtha—storage tanks to prevent evaporative losses by "breathing."

Other methods which can be successfully adopted to prevent or reduce the permeability of rubber to gases include incorporation or surface application of plastic materials of other type, *e.g.*, glue, glyptals, etc.

From the preceding review it will be seen that the possibilities of rubber and rubber products in the chemical engineering field are wide. The fuller development of the field calls for complete and careful co-operation by the chemical engineer and the rubber manufacturer.[3]

[3] The importance of this line of development of rubber-uses is shown in a recently published booklet on "Rubber and Chemical Engineering" by the Rubber Growers' Association, which body has also in active preparation—by the Research Association of British Rubber Manufacturers—a compilation of the more important rubber data for assistance of chemical engineers and others in their selection of rubber generally or of special types of compounded rubber for various constructional purposes.

Report on Tire and Tube Sales Tax

TIRE MANUFACTURERS paid on the average a sales tax of 47.9 cents for every pneumatic casing and a sales tax of 10.6 cents for every inner tube sold during the calendar year 1933. This tax, it is assumed by the Leather-Rubber-Shoe Division of the Department of Commerce, which revealed the sales tax figures on October 20, was passed on to the consumer. The total amount paid the government under this excise tax for 1933 sales (allowing one month lag) was $24,947,116.22 or 9.76% of the total sales values of tires and inner tubes of all kinds, including bicycle and tractor tires, produced in 1933, officially reported by the Bureau of Census at $255,595,907. Rubber tires, other than for automotive use, amounted to 2.90% of the 1933 total and the value of non-automotive inner tubes was about 1.68% of the total inner tubes sold for the same year.

The data made available on receipts by the Federal Treasury under the manufacturers' excise tax on sales of tires and tubes for the years ending 1932 and 1933, and the first 8 months of 1934, in table form, follow:

Domestic Excise Tax on Tires and Inner Tubes

	Tires	Inner Tubes
1932		
(July-December)	$6,225,328.86	$1,319,741.96
1933		
(January-December)	19,816,532.66	4,019,586.00
1934		
January	1,350,740.06	327,674.00
February	824,311.32	198,744.75
March	1,839,327.63	442,540.99
April	940,514.63	232,815.19
May	1,961,053.12	474,000.41
June	2,123,876.79	513.441.15
July	2,326,328.38	548,536.37
August	1,841,983.56	423,797.68
(Total: Jan.-Aug.)	13,208,135.49	3,161,550.54

This manufacturers' excise tax is assessed on the weight of all kinds of rubber tires (2.25 cents a pound) and inner tubes (4.00 cents a pound) and is payable on all manufacturers' sales. The tax does not apply to sales for export. After August 1, 1933, under the terms of Section 9 (a) of the Agricultural Adjustment Act, tire manufacturers no longer paid the sales tax on the total weight of casings, but on the weight minus the cotton content. This clause was inserted to safeguard manufacturers who were paying the processing tax placed on cotton. The clause, however, has been interpreted as not exempting manufacturers from the sales tax if the cotton used in making tires had been taxed under floor tax provisions instead of under processing tax provisions.

The larger tire manufacturers are reputed to have had considerable stocks of cotton on hand when this provision was inserted in the Agricultural Adjustment Act subject to the floor tax provisions and were, at first, unable to benefit from the allowance on the processing tax provisions. In recent months, however, most of the tire manufacturers have been using cotton on which the processing tax had previously been paid and were allowed the net weight (gross weight minus cotton content) when paying the sales tax.

For the twelve months ending July, 1934, the gross calculated weight of the average tire was about 20 pounds. The Division points out that if all manufacturers had been paying the tire sales tax on the weight of tires after deduction of the cotton content then the gross calculated weight of the average tire would be closer to 24 pounds.

Of interest to suppliers of chemicals, compounding ingredients, and other materials, is the distribution of tire production by states revealed by the report on sales tax receipts. The report makes clear the fact that percentages given by states is not strictly accurate but close enough to be regarded as highly authentic. The percentages revealed represent domestic sales on which taxes were paid by the manufacturers and covers the twelve months ending June 30, 1933 and 1934.

Percentages on tires for the five leading states for the twelve months ending June 30, 1934, were, as follows: Ohio—58.67 ; Michigan—15.47; California—8.96; New York—3.69; Pennsylvania—2.84. Minnesota showed the lowest production with .02%. Percentages on inner tubes closely followed those of tires.

Reogen—A New Processing Agent

OFFERED PRIMARILY as a time and money saver in the factory, the R. T. Vanderbilt Company, New York City, has introduced Reogen, described as a new processing agent for rubber and said to be effective in small dosages. According to the manufacturer this thermoplasticizing agent reduces or eliminates premastication of rubber before mixing, aids processing by causing the rubber to soften when warm and allowing it to stiffen when cold, tends to prevent scorching during mixing and calendering, promotes good dispersion of carbon black and other ingredients in the rubber, and saves time, power and money in the mill-room.

The composition of Reogen is as follows: Sulfo A (15), Normal Butyl Alcohol (5) and mineral oil (80). Its consistency is medium thin oil; it has a clear mahogany color; its specific gravity is 0.86 (7.15 lbs. to the gallon); dosage —from 0.5 to 1.5% on the rubber. Reogen is non-toxic and has no effect on the aging of cured compounds. It has a slight retarding action on cure at low curing temperatures, which together with its function of reducing working temperatures, gives it scorch-preventing advantages.

Reogen may be added to the rubber either on a mill or in a Banbury mixer, being handled more easily and absorbed more quickly in the latter. Unbroken rubber should be used and the new agent added as soon as possible after rubber is put on the mill or in the mixer. Mastication, for about two minutes, to heat the rubber up before adding Reogen is recommended by the manufacturer. After the addition of Reogen the rubber softens and smooths out rapidly, after which the addition of other ingredients may be carried out.

In practically any stock, about 1% of Reogen on the rubber is sufficient for good results. In stocks that are highly loaded with carbon black or other fillers up to 1.5% may be necessary. It is advantageous to add Reogen at the beginning because of the small dosages involved rather than split it as some operators prefer.

Reogen has also been found of value in tread stocks where considerable proportions of pine tar are common. The use of 1 to 1.5% Reogen, instead of 3 to 5% of pine tar, allows tread stock to be mixed more easily and with better gas black dispersion, according to the manufacturer of the new processing agent.

Thiokol B

HERETOFORE the ethylene polysulfide product produced by the Thiokol Corporation, Yardville, N. J. was designated as plain Thiokol. The introduction of an improved product caused the company to re-designate its product in two classes, i.e., Thiokol A and Thiokol B. The latter product contains many improvements which give it an added commercial importance. The main characteristics of the B product lies in its mild odor and the fact that it does not give forth any gases on the mills or in processing. It is flexible at —40°F. It is said to be practically unaffected by petroleum products and is not affected by ozone. Thiokol B takes about twice the loading of the A product and can be alternated on the mill with rubber without any danger of contamination to the rubber and no necessity for hooding, ventilation, etc.

Processing is feasible with the same equipment ordinarily used for rubber compounds. It has been found that quantities of the new product in a rubber stock, up to 5%, did not impart a disagreeable odor to the rubber. Its flexibility at —40°F. is of importance for applications that are used outdoors in cold climates. The addition of rubber is not necessary to secure flexibility at low temperatures. It has a tendency to crumble when first put on the mill and forms a short sheet that does not run smooth around the roll. The addition of pigments is said to cause it to smooth out and cling to the front roll. It is soft by nature and requires little extra softening.

Approximately 10 parts of material such as zinc oxide is required to cure Thiokol B properly. Channel black improves its physical properties. Forty parts of channel black gives about the same hardness as 25 parts with Thiokol A. Soft blacks, such as Gastex or Fumonex, are said to be of particular value in increasing the tensile strength as much as channel blacks but do not decrease the elongation proportionately. Stearic acid is of aid in preventing sticking to the molds. In its uncured state it has shown no tendency to harden, according to the manufacturer. Satisfactory aging tests have not yet been concluded and therefore results are not available at this time.

Lubrication of Rubber for Vulcanizing

THERE ARE TWO general types of materials used for freeing vulcanized rubber from molds at the end of the curing operation. These are liquids and powders. The first class—of which soaps and sugars dissolved in water are representatives—is generally used where discoloration of the finished goods is not objectionable, or when they are cleaned by washing after vulcanizing. The second, powders, is divided into two classes: i.e. pigmenting and non-pigmenting. The former are used where a slight pigmenting effect of the lubricating powder, of which talc and starch are representatives, is not objectionable. On light colored goods, where it is desired to maintain discoloration at a minimum, powdered lubricants of the type that either will be absorbed or can be tumbled off after the goods are cured are used. Representatives of this latter type are either a good grade of whiting or pumice.—*R. R. Olin Laboratories.*

Properties of Laytex Insulation

PRODUCTION on a commercial scale of wires insulated with Laytex, the dielectric for which many unique properties are claimed, was recently announced by the U. S. Rubber Company. Laytex is said to be more flexible, have greater tensile strength, better resistance to compression, higher dielectric strength and insulation resistance, than any other insulation. Laytex also permits thinner walls which make possible finished conductors lighter in weight and smaller in bulk.

Wires covered with this insulation are passed vertically through a series of baths of latex (with proteins, sugars and water solubles removed), the liquid solidifying after each dip. This process centers the conductor perfectly and gives a uniform wall thickness. Physical and electrical properties show tensile of 5,000 lbs.; elongation, 750%; dielectric strength, 800 volts per mil; insulation resistance constant, K=54,000; relative specific inductive capacity, 2.5; low moisture absorption.

Water Diffusion Through Materials

(Continued from page 74)

water absorption of the wax is also small, yet its diffusivity is only about one fortieth of that of the polystyrene. Both materials are homogeneous, non-polar compounds. The difference between their diffusivities appears to be due to differences in their physical and chemical structure of some other sort than those determining sorption. In sharp contrast is the case of cellulose acetate, through which moisture passes 1600 times as fast as through hydrocarbon wax. Here the sorption of water is strong and probably borders on chemical union, as does the interaction of palladium with hydrogen. It is very likely that the higher sorption affects the diffusivity, and that both are largely accounted for by the same features of chemical structure.

To arrive at a true picture of the mechanics of moisture diffusion through organic substances much additional work is required. The measurements made in these Laboratories form only a beginning in this direction.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF MARCH 3, 1933 of THE RUBBER AGE, published monthly at East Stroudsburg, Pa., for October 1, 1934.

State of New York } ss.
County of New York }

Before me, a notary public in and for the State and county aforesaid, personally appeared Peter P. Pinto, who, having been duly sworn according to law, deposes and says that he is the Business Manager of THE RUBBER AGE and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers, are:

Publisher, Palmerton Publishing Company, Inc., 250 W. 57th St., New York City; Editor, Peter P. Pinto, 250 W. 57th St., New York City; Managing Editor, M. E. Lerner; Business Manager, Peter P. Pinto, 250 W. 57th St., New York City.

2. That the owner is (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given):

Palmerton Publishing Company, Inc., 250 W. 57th St., New York City; P. L. Palmerton, 250 W. 57th St., New York City; Earl D. Osborn, 40 E. 36th St., New York City.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are:

None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholders or security holders appear upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest, direct or indirect, in the said stocks, bonds, or other securities than as so stated by him.

PETER P. PINTO, Business Manager.

Sworn to and subscribed before me this 20th day of September, 1934.

[SEAL] HANNAH GOLDENSON, Notary Public.

(My commission expires March 30th, 1936).

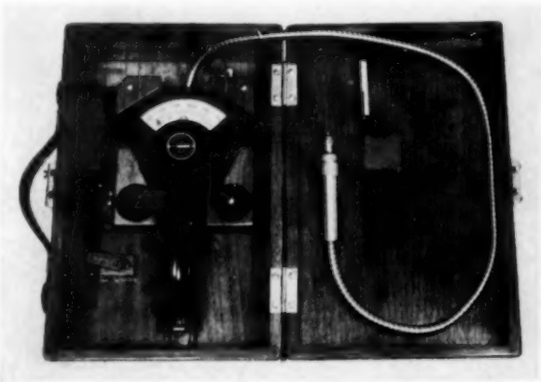
New Equipment

Cambridge Needle Pyrometer

THE need for accurate checking of temperatures of rubber being milled, extruded or calendered has resulted in the development of a Needle Pyrometer which gives quicker and more accurate readings than is possible with the Surface Pyrometer. This new device, developed by the Cambridge Instrument Company, New York City, is an adaptation of the surface pyrometer made by the same company.

Modern milling and compounding practice demands close control of temperatures so as to prevent scorching and to maintain batches at the best working temperatures. It is therefore apparent that an instrument which gives accurate readings of the batch itself, instead of only the mill rolls, is likely to result in a distinct saving in a rubber factory. The Cambridge Needle Pyrometer has already proved valuable in checking temperatures in the following operations:

In breaking down rubber on open mills, where rubber must be kept below 300° F.; in mixing batches with fillers in the Banbury considerable heat is generated and close temperature control is required; in mixing in open mills, after sulphur and accelerators have been added, the temperature should be kept below 230° F. (varying with the mixture); in tubing operations temperatures must be kept uniform to maintain proper dimensions of the extruded stock; in warming up prior to calendering, stock should be kept below 150° F.; in calendering, the temperature of stock must be carefully watched in order that there may be no variation in the thickness of the sheet.



Other uses readily suggest themselves in various operations in a rubber factory. The Needle Pyrometer is easy to handle, is rigidly built and comes packed in a handy case as shown in the accompanying illustration.

Liquid Gauge for Process Work

DIFFERING from other types of liquid gauges a new type has recently been placed on the market by Imperial Instruments, Inc., a subsidiary of Imperial Electric Company, Akron. It is used for measurement of liquids used in process work. The accompanying diagram (Figure 1) shows the hydrostatic principle of operation of the gauge. The liquid in the tank is connected by means of copper tubing to a bellows type, metal diaphragm which is linked mechanically to the indicator of the gauge. As the tank is filled the diaphragm expands, the linkage moves the indicator and the reading on the dial shows the exact quantity in terms of gallons, pounds, barrels, inches, or any other desired unit. The measurement is based on pressure and therefore on weight. This means that the gauge may be calibrated to show the correct volume at any specified temperature.

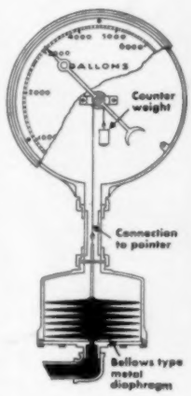


Figure 1

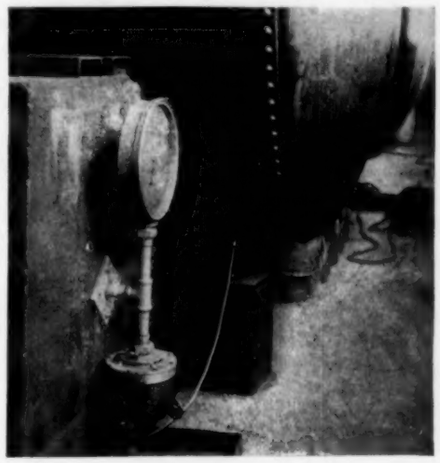


Figure 2

Where the liquid is under vapor pressure, it is possible to compensate for this pressure by connecting the diaphragm housing with the top of the tank containing the liquid, by means of copper tubing. These gauges are built to measure liquids in tanks ranging in capacity from 300 gallons to 3,200,000 gallons. Practically any type of liquid can be measured with this gauge except liquids that tend to form a solid mass when standing, or those that attack the phosphor bronze diaphragm.

Figure 2 shows an 8,000 gallon solvent tank in a rubber plant, equipped with an Imperial liquid gauge which indicates the exact quantity of solvent drawn off for process work.

Brown Thermometer Controller

THE use of mercury switches to eliminate open make-and-break contacts controlled by the pointer, is a feature of a new Automatic Control Indicating Thermometer announced by The Brown Instrument Company of Philadelphia, Pa. In this new controller, every six seconds a motor-driven control table determines the location of the pointer in reference to the control setting, and tilts the mercury switch from one side to the other if the temperature has changed.

Editorial Comment

"Sales Resistance" of Rubber

DESPITE the many million words which have been published on rubber and rubber products in newspapers and magazines in recent years there is still considerable "sales resistance" to certain articles as soon as the public discovers that rubber is used. It is unfortunate of course that such a condition still exists after the extended efforts which have been made by rubber manufacturers to break down this opposition by means of their national and business paper advertising campaigns. But exist it does—and sometimes in the most embarrassing quarters!

For instance, when the concern which had the exclusive sales rights to Lastex started to market this product in the several branches of the textile industry it was most careful to avoid the use of the word rubber in discussing the virtues of Lastex. This avoidance was not done because of any actual disadvantages of rubber but because they believed it would be harder to sell Lastex as a new material if it was broadcast that the thread was made of rubber.

Another instance which has just come to our attention is in regard to a new resilient rug cushion produced by the rubber division of a well known domestic manufacturer. A descriptive circular on this new product does not in any manner mention rubber—yet to one in the rubber industry it is immediately obvious that the rug cushion must contain rubber in order to possess the many virtues described. Upon investigation we found that rubber was used in this product. Again we say that the word rubber was purposely omitted in connection with the promotion of this article because it was felt that it would meet with too much sales resistance from the prospective housewife-customer!

Other instances can be cited. We are all familiar with the department store advertisements which make a particular point of stating, "contains absolutely no rubber," in describing a raincoat or shower curtain, but we feel that no point is served in continuing the list indefinitely.

We in the industry know that all the common beliefs in regard to rubber are false. No longer is it true that a rubber product must smell "rubbery"—thanks to odorants. No longer do rubber products exposed to light and air fall apart in a few months—thanks to anti-oxidants and similar materials. No longer do tires wear out within a few thousand miles—thanks to improved reinforcing materials.

These facts, however, appear not to be generally known by the buying public. Even manufacturers who use rubber in some form in their products seem to shy clear of the word rubber in describing their manufactures, as in cases cited, when offered for public sale.

The answer to this problem apparently lies in an educational campaign, one which would direct specific attention to the many advantages of *present-day rubber articles*, as compared with similar articles manufactured years ago. Such a campaign could be financed by rubber manufacturers whose products are sold direct to the public with possibly the aid of makers of chemicals and compounding materials or other companies who would be benefited in the long run by an increased acceptance of rubber products by the public and by industry in general.

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Policing the Tire Industry

THIRTEEN months ago, in our October, 1933, issue, we carried an editorial with reference to the completion of the Code of Fair Competition for the tire industry, which said, in part, "We cannot help but believe that the rubber industry has accomplished something in the preparation of the code, which will, in the future, be looked upon as the cornerstone of a new era, the beginning of a new spirit of cooperation between the various conflicting factors in the industry." We also stated that the result of industry's deliberations would be felt long after NRA is forgotten. And we pointed out the importance of an "appreciable number of rubber manufacturers getting together to talk over the ills of the industry."

With the recent declaration that industry in general, the tire industry in particular, was foot-loose and fancy-free to do its own policing, the weight of that former editorial is felt. Tire manufacturers have always talked about cooperation, but NRA forced them together in a mutual effort to preserve peace and profits, both dear to tire makers. But the real importance is this: now that restrictions concerning price-fixing have been abolished, now that government regimentation has lifted, now that the tire industry has been left to its devices, tire manufacturers have banded together in group meetings and conferences *of their own volition* and are agreeing, and have agreed, upon an industrial price policy that will be mutually beneficent.

We whole-heartedly agree with Akron, Jr., prolific writer of the Akron Beacon Journal, who in a letter to William O'Neil, of General Tire, concurred with the latter's belief that "the tire industry can do its own policing" far better than under government supervision, but who pointed out that "maybe it can, Bill, but not if you and F. A. and Litch and J. D. and Harvey plunge into a free-for-all over which one is to be patrolman."

Whether the policing of tire dealers by tire manufacturers can be successfully accomplished remains to be seen, but we glory in the fact that at least these manufacturers are now working in, what on the surface is, close harmony and perfect accord.

CURRENT • NEWS
of the Rubber Industry

NOVEMBER, 1934

Tire Manufacturers Raise Prices 5 to 25% In Effort to Eliminate Consistent Losses

As Predicted United Move Made by Tire Makers Is First Step to "Police" Their Own Industry—Average Increase is 18%—Goodyear Leads in Price Rise

AS expected, since the collapse of the "floor prices" under the NRA on October 1, tire prices have been increased from 5 to 25% effective November 1, 1934. "Spring dating" details are generally announced on or about this date under which dealers are guaranteed against additional price changes for six months, which freezes the cost list. The first announcement with regard to increased prices came from the Goodyear Tire & Rubber Company which raised prices from 5 to 25%, depending upon the type, brand and locally prevailing trade practices. Although official confirmation was not made by other Akron tire makers (at this writing) price increases have gone into effect on practically all nationally-known tires including U. S. Rubber, Firestone and Goodrich. List prices, other than Goodyear, have been raised by 5% on first line tires, 10 to 12% on second line, 11 to 15% on third line and 5% on solid tires. Tube prices have increased proportionately.

In addition to the tire price increase, which represents the first unified move made by the industry since July, 1933, and which follows a series of "price wars" since that date, dealer discounts have been reduced. Special selling bonus plans have also been eliminated in most instances. Through the reduction of discounts and elimination of the special bonuses, plus the list price increase, the net return on tires to the manufacturers, whose increases are 5 to 14%, is estimated to have been raised by approximately 18%.

The reduction in discounts, the result of numerous conferences held by the tire manufacturers in Akron and Chicago, represents an attempt to curb the activities of "gyp" dealers and "chiselers." The reduction narrows the differential between dealer prices and retail prices, thereby compelling dealers to sell at list prices. It is hoped that this move will check "price wars." Under NRA supervision list prices were entirely ignored by dealers.

As pointed out by P. W. Litchfield president of Goodyear, the move toward raising prices was "made mandatory by substantial increases in production costs during recent months." He pointed out that "cotton prices are up 135% from depression lows and rubber prices have advanced more than 400%." Mr. Litchfield also stated that wages at Goodyear have been increased 27%.

In establishing minimum or "floor prices" the NRA set prices about 22½% below list with the expectation that these minimums would establish a limit for price cutting but that most business would be transacted at list levels. Unfortunately, in a short time, virtually all tire sales were being made at the minimum prices because of excessive competition and competitive pressure. Because of this reason actual retail prices during the past year have been close to the record lows of the industry.

It is understood that U. S. Rubber has increased prices on their tires from 5 to 13.8%. Goodrich is believed to have made increases averaging about 10%. Representatives of the General and Seiberling concerns have stated that their increases would be similar to those of Goodyear.

Some Reluctance Heard

According to an executive of a leading Akron tire manufacturing company, the new prices will permit both manufacturers and dealers to make and sell tires on a profitable basis for the first time in four years. As an example of what the increase will do to retail prices he pointed out that a 5.50 x 17 popular sized tire will retail at $12.00 whereas, in certain sections of the country, it has retailed for as low as $6.00.

Although some dealers have complained about the price rise based on the claim that increased prices will cause sales to fall off to a marked degree the manufacturers feel that such sales will only decline temporarily. As one manufacturer put it "motorists will buy when they realize that prices are up to stay." In this respect it was pointed out that tire sales increased 300% soon after reductions were put into effect last season after earlier announcements of increased prices had gone into effect. It was because of these figures that a few of the tire manufacturers were reluctant to join in the unified price increase.

Tire manufacturing authorities have expressed the opinion that this unified action taken by the industry opens a new era of cooperation. While similar steps in the past have subsequently been violated by the resumption of excessive competition there is more confidence in the present move than any earlier undertaking.

A further increase of 10% above present increases, was urged by F. A. Seiberling, of the company bearing his name. In urging still further increases the "Little Napoleon" of the tire industry stated "The move was led by the big four and the little fellows are following along . . . the big fellows became mellowed by red figures and it looks like we are going to play ball."

Mr. Seiberling headed a delegation of the smaller tire manufacturers from the Akron district to New York early this month to meet with other manufacturers of the same status in an attempt to iron out details of the complicated new tire price set-up adopted by the larger producers. It is believed, however, that these smaller manufacturers will follow in the footsteps of the price increases already announced.

Mail order houses, including Sears, Roebuck & Company and Montgomery Ward & Company, have not, as yet, announced tire price increases. An announcement by the former concern, which sells private brand tires made for them by the Goodyear company, stated that "if tire companies generally announce higher prices no doubt Sears will make adjustments in its tire prices."

The purpose of the several meetings held by tire manufacturers preceding the price rise was not so much the actual price rise itself as the method in which the increase should be effected. The answer was found in lower dealer discounts and elimination of special bonuses.

Ford to Spend Millions

Tire manufacturers, particularly in Akron, were elated at the statement made early this month by Henry Ford who declared the "depression is over for my company." To back up his assertion Mr. Ford announced the expenditure of one-half billion dollars and the production of one million automobiles. From this single customer Akron tire companies (three of them in particular) expect orders amounting to more than $20,000,000, based on the fact that the Detroit manufacturer annually buys 85 to 90% of his requirements from Goodyear, Goodrich and Firestone.

NEW YORK GROUP HOLDS ITS FIRST FALL MEETING

Some 125 members attended the first fall meeting of the New York Rubber Group, American Chemical Society, held on October 19 at the Building Trades Employers Association's clubrooms at 2 Park Avenue, New York City. An executive meeting was held prior to the usual dinner. Entertainment was furnished by the radio star, "Tex" Ritter, who amused the crowd with song and story.

Two committees were appointed during the course of the evening. Members appointed to the Nominating Committee were W. O. Hamister, chairman, (Naugatuck Chemical Co.); K. J. Soule (Manhattan Rubber); and M. R. Buffington (Lea Fabrics). The committee to attend to details of the coming Christmas Party is headed by R. E. Casey, Naugatuck Chemical Company, as chairman, and includes George C. Grove, New Jersey Zinc Company, and D. A. Shirk of the Rare Metal Products Company.

Only one speaker was presented on the program. As scheduled, W. B. Wiegand, of Binney & Smith Company, delivered an informal address in which he gave his impressions of the Far East gathered on his recent trip to far climes and climates. "Bill" told of his experiences in Japan, where wealthy families dominate the entire industrial structure, although the three tire companies in the country are operated by English, American and Japanese companies, respectively; of China, and its efforts to modernize the rubber factories located in Shanghai; of Singapore, and the peculiar position of the agents who virtually control the output of the local rubber plantations in devious ways; of Sumatra; of Colombia and finally of Africa. At the conclusion of his informal address a film was shown by Mr. Weigand illustrating the various points discussed in his "ramblings."

Chairman Carl Wright called a vote on the prospect of changing the nights of meetings of the group from Friday to some other week-night, but a unanimous vote decided in favor of the regular Friday nights. This first fall meeting was thoroughly enjoyed by those attending and was indicative of a huge gathering at the annual party to be held on Friday, December 14.

CRUDE RUBBER INDUSTRY SUBMITS REVISED CODE

Crude rubber importers in this country, represented by the Rubber Trade Association of New York, which claims membership representing 95% of the trade, has submitted a proposed supplementary code of fair competition, to the basic code governing the importing trade in general, to National Recovery administrators in Washington. Copies of the proposed code may be secured from Room 3316, Department of Commerce Building, Washington, D. C.

At the time the regulations governing imports went into effect last year the Rubber Trade Association requested and received an exemption for crude rubber importers. The exemption will remain in force until after public hearings are conducted on the recently submitted proposed supplementary code. Hearings were scheduled at Washington beginning November 8.

Galoshes Found Guilty!

Last month these columns advised our readers that a pair of galoshes were to be placed on trial in Soviet Russia on charges of "imperfections." The galoshes were found guilty on October 15 on the grounds of being of inferior quality. Symbolizing all delinquent Soviet galoshes, a giant pair was placed in the prisoner's dock at Moscow, and given a formal and impartial trial before a jury composed of technical experts, union representatives and ordinary wearers of galoshes. With head hung low the galoshes were ordered back to the factory with orders to their manufacturers to improve their qualities so that they will not only be fit to wear on Russian feet, but also suitable for export.

Tornesit To Be Made Here

Work will begin shortly on the construction of a new factory at Parlin, N. J. for the manufacture of Tornesit, product of the Hercules Powder Company, Wilmington, Delaware. With the opening of this factory, Tornesit, a chlorinated rubber product used in the protective coating industry, will be produced in this country for the first time, replacing the material now being imported from Germany.

New Equipment for Standard

Standard Products Company, Port Clinton, Ohio, manufacturers of channel rubber products, plans to install two new 16-inch mills and a new tubing machine. The new equipment, which together with new dies, will amount to $60,000, is required for the production of a new style rubber trimming material recently introduced by the company. G. E. Duffy, general manager, is preparing for a busy season due to expected changes in automobile designs for 1935. Employment is expected to reach the 400 mark.

Publish Crude Rubber Chart

The Commodity Exchange, Inc., New York City, is now publishing the "Crude Rubber Chart," which is to be issued monthly. The purpose of the chart is to present in graphic form monthly and cumulative comparisons with the previous year's figures of the principal crude rubber statistics and also to show the comparisons between actual totals of rubber shipped from principal centers and the percentage of the quotas allotted to those centers under the restriction scheme.

Rubber Firm Fined $1,000

Cotex Corporation, Newark, N. J., manufacturers of automobile fabrics, proofing and backing, the seventh largest in that industry, last month was fined $100 on each of ten counts, a total of $1,000, for selling at lower prices and on more favorable terms than those filed by it with the Rubber Manufacturing Code Authority. The company pleaded guilty when charged with such violations and the fines followed.

SEPTEMBER CONSUMPTION IS 8.9% BELOW AUGUST

Consumption of crude rubber by manufacturers in the United States for the month of September amounted to 30,352 long tons, which compares with 33,310 long tons for August. September consumption shows a decrease of 8.9% under August and 14.0% below September a year ago, according to statistics released by the Rubber Manufacturers Association. Consumption for September (1933) was reported to be 35,281 (revised) long tons.

Imports of crude rubber for September were 28,835 long tons, a decrease of 13.3% under August figure of 33,248 long tons and 39.1% below 47,352 long tons imported in September 1933.

Total domestic stocks of crude rubber on hand September 30th were 359,667 long tons, which compares with August 31st, stocks of 362,647 long tons. September 30th stocks show a decrease of less than 1% below August 31st stocks, but were 6.6% above stocks of September 30, 1933.

The participants in the statistical compilation report 38,831 long tons of crude rubber afloat for the United States ports on September 30th, compared with 40,278 long tons afloat on August 31st, this year, and 54,525 long tons afloat on September 30, 1933.

September reclaimed rubber consumption is estimated to be 7,028 long tons; production 6,974 long tons; stocks on hand, September 30th, 24,540 long tons.

AUGUST TIRE SHIPMENTS EXCEED THOSE IN JULY

Shipments of pneumatic casings for the month of August amounted to 4,308,270 casings, an increase of 3.6% above July, this year, but were 8.5% below August (1933), according to statistics released by The Rubber Manufacturers Association, Inc.

Production of pneumatic casings for August was 3,532,631 casings, an increase of 5.4% over July, and 29.3% under August, 1933.

Pneumatic casings in the hands of manufacturers on August 31st amounted to 8,697,151 units, a decrease of 7.8% below stocks on hand July 31st, 1934, but were 23.0% above stocks August 31, 1933.

The actual figures are as follows:

PNEUMATIC CASINGS

	Shipments	*Production*	*Inventory*
Aug., 1934	4,308,270	3,532,631	8,697,151
July, 1934	4,157,411	3,352,836	9,436,816
Aug., 1933	4,707,085	4,993,609	7,069,574

Appointed Goodyear Distributor

N. L. Kuehn Company, Milwaukee, distributors of mechanical and molded rubber goods, was appointed last month by Goodyear Tire & Rubber Company as a distributor of its mechanical rubber goods in Wisconsin. The firm will carry a supply of Goodyear belting, hose and packing on hand for immediate sale in the territory allotted to it. The company maintains a well equipped laboratory for the testing of mechanical rubber goods which is made available to its customers. N. L. Kuehn is president of the firm while George McCredie is vice-president and store-manager.

RUBBER SAFETY SECTION ELECTS NEW OFFICIALS

Election of members to the Executive Committee was the highlight of the two-day meeting held by the Rubber Section of the National Safety Council, Inc., during the 23rd Annual Safety Congress held in Cleveland on October 2-3. The first session was called to order by General Chairman H. T. Low who briefly described the activities of the section during the year including the spring meeting of the Executive Committee. He announced the retirement of Ben F. Gerpheide, of Goodyear, from section activities due to the latter's transfer to another Goodyear division.

Discussing safety progress in the rubber industry, J. J. Loge, of General Tire, reported that the industry was holding its own. He blamed the influx of new men during busy seasons for the majority of accidents experienced by factories and pointed out that statistics reveal that handling objects and machinery caused 60% of accidents in 1933. Following Mr. Loge, W. W. Stephens and W. L. Schneider, of the Goodyear and Goodrich companies, respectively, spoke on "Safety in Rubber Mill and Calender Operations." The former spoke of the foreman's position in this respect while Mr. Schneider went into the subject from the engineer's standpoint.

Other addresses during the first day of the meeting were delivered by J. T. Kidney, Manager, Employees Service Division, Goodyear Tire & Rubber Company, whose topics ranged from the dole system in England to compensation in connection with safety; Dr. W. S. Ash, Plant Physician, U. S. Tire Company, who spoke on the "Dust Problems in the Rubber Industry," pointing out that the actual dangers are far less than the imaginary terrors ascribed to the industry; Dr. J. Newton Shirley, Arrow Mutual Liability Insurance Company, who discussed the same topic from the angle of collecting dust; and G. T. Hellmuth, General Claims Attorney, Chicago North Shore & Milwaukee Railroad Company, who talked about the value of safety contests.

At the conclusion of Mr. Hellmuth's address he presented a plaque to the Goodyear Tire & Rubber Company, Toronto, Canada and certificates to the U. S. Rubber Company, Naugatuck, Conn., and the Sampson Tire & Rubber Corporation, Los Angeles, all in the A and B Group, for their respective safety records.

In the C and D Group plaques were awarded to the following for going through the contest conducted by the Rubber Section without a lost-time accident: Dunlop Tire & Rubber Corp., Buffalo; Goodyear Tire & Rubber Company, Brownsville, Canada; Van Cleef Bros., Chicago; Reclaim Plant, Goodyear Tire & Rubber Company, Akron; and the Fabric Fire Hose Company, Sandy Hook, Conn. Certificates in this group were awarded to the Gadsen, Alabama, plant of Goodyear and the Hewitt Rubber Corp. of Buffalo, N. Y.

The first speaker on the program for the second day was E. W. Beck, Supervisor of Safety, U. S. Rubber Company, who delivered an address on the "Hazards of Rubber Cement Churn and Storage Rooms." His talk embraced every known hazard in these departments. Four companies cooperated in the presentation of the annual safety kinks program which was illustrated by a series of interesting slides presented by H. A. Walker of Goodyear. The four companies were U. S. Rubber, Corduroy Rubber, B. F. Goodrich and Goodyear Tire & Rubber companies. The last speaker was G. C. Hantelman, Instructor, Goodyear Industrial University, who delivered an address on "How Should the Foreman Train the Worker?" He discussed the duties confronting the foremen in this respect.

Members elected to the Executive Committee of the Rubber Safety Section for the coming year include: General Chairman, H. A. Walker, Goodyear Tire & Rubber Company, Akron; Vice-Chairman, A. M. Dietz, Pennsylvania Rubber Company, Jeannette, Pa.; Secretary, J. M. Kerrigan, U S. Rubber Reclaiming Company, Inc., Buffalo; News Letter Editor, W. H. MacKay, Dunlop Tire & Rubber Corporation, Buffalo.

Additional members of the Committee, assigned to various duties, include the following: D. G. Welch, Hewitt Rubber; Dr. W. S. Ash, U. S. Tire; Dr. J. Newton Shirley, Hood Rubber; E. W. Beck, U. S. Rubber; Oliver Hopkins, National India Rubber; J. J. Loge, General Tire; Paul Van Cleef, Cleef Bros.; and R. W. Morse, Firestone Tire.

Members at large include the following: F. C. Bishop, J. C. Brown, R. A. Bullock, J. L. Grider, C. F. Horan, J. T. Kidney, H. W. Low, H. T. Martin, M. A. Quirk, M. L. Russel, W. L. Schneider and Charles F. Smith.

Canadian Tire Price Rise

An approximate rise of 5% in all tire prices to consumers has been announced in Canada. Actual increases vary to some extent, because of the differences in excise taxes paid on different types of tires, but no increase greater than 5% has been made on any single type of tire.

AUTHORITIES APPROVED FOR SCRAP RUBBER TRADE

Code authorities for the scrap rubber trade were approved by the National Recovery Administration on September 20. The personnel of the group follows:

Edward B. Friedlander, Lowenthal Company, Chicago; Samuel Greenfield, Samuel Greenfield Company, Inc., Buffalo; Julius Muehlstein, H. Muehlstein & Company, Inc., New York City; Philip Hirsch, Hirsch Salvage Company, Cleveland; A. Schulman A. Schulman, Inc., Akron; Aaron Pollack Bros. Scrap Rubber Corp., Brooklyn, N. Y.; and George Liftig, S. J. Liftig & Son, Ansonia, Conn.

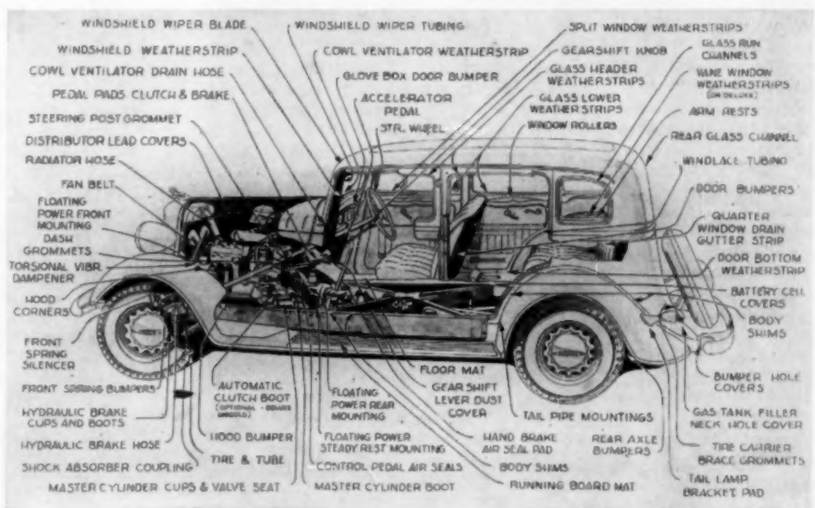
Fordlandia Is Expanding

There are now 1,200,000 rubber trees in full development in one tract of more than 8,000 acres in Fordlandia, Henry Ford's plantation in Brazil. In addition to these trees there is a total of 1,500,000 being cultivated in nurseries. Fordlandia comprises some 3,000,000 acres in all. Approximately 1,000 Brazilians now live and work on the huge tract. A Brazilian official recently predicted that Henry Ford will "control the world supply of rubber within a decade."

Organize 20-Year Association

More than 1,000 members of B. F. Goodrich Company, Akron, all of whom have served in the company's employ for more than 20 years, have formed an association to include only members who have such long-standing records of service. Al Hupfer was appointed temporary chairman for the group, which will shortly adopt a name, policy, by-laws, and the like.

1934 DODGE REPLETE WITH PARTS MADE OF RUBBER



Above are indicated the 56 rubber parts used on Dodge automobiles

As new engineering advances are made in the field of automobile manufacture rubber plays a greater role annually. In past issues we have devoted several pages to tell our readers of this role. Another example is to be seen from the above reproduction of the 1934 Dodge. Several dozen rubber parts are included in the construction of this car the majority of which enable the manufacturers to stress their advertising claims of smooth and even riding comfort. The next big step visualized in this industry is the use of rubber seats which will result in still smoother riding. Engineers are now actively engaged in solving the problems that yet befront them before incorporating this improvement. As the above reproduction depicts there is scarcely a single spot in the modern automobile, from engine to roof, that does not make effective use of rubber.

OSCAR NELSON HOST TO TECHNOLOGISTS

Representatives of Rubber, Paint, Ink and Paper Industries Examine United Carbon Laboratories—Guests Also Enjoy Football Game—Banquet and Dance Also Held.

Over 300 technologists from leading companies in the rubber, paint, ink and paper industries were guests of Oscar Nelson, president of the United Carbon Company, on Saturday, October 27, at Charleston, West Virginia, at the annual inspection of the company's research, control and development laboratories. The guests came from all parts of the country, representatives being on hand from California, Louisiana, and Texas, as well as from adjacent states in the South and Middle West and from practically every state in the East. Several from Canada and one guest from England attended the meeting which has come to be a growing annual affair.

The guests from the East and Canada were entertained at a luncheon at the Empire State Club, in the Empire State Building, New York City, on the previous day. There were added to the regular train to Charleston four extra Pullman cars and a private diner to accommodate the large group which left from New York on Friday night.

The company's research, control and industrial development laboratories were visited in the morning, when A. G. Treadgold and H. Walter Grote, assisted by Asst. Chief Chemist G. L. Roberts and Wm. W. Higgins, Eastern District Manager, described the various equipment and tests made on the company's products. The visitors were greatly impressed by the completeness of the available devices and the facilities for control and research testing and showed particular interest in the development laboratory where several new products are being perfected.

Following a luncheon at the Daniel Boone Hotel, Mr. Nelson's guests attended a football game between the Charleston and Ashland (Ky.) High Schools in which the local team won. In the evening the visitors were entertained at an elaborate dinner at the same hotel. Many celebrated local and state executives in addition to members of the staff of the company and some of its Board of Directors spoke briefly following the dinner. The only rubber executive who addressed the gathering was R. P. Dinsmore of Goodyear.

Among those who spoke, following the hearty welcome by Mr. Nelson, were former Governor Conley of West Virginia, Mayor R. P. DeVan, who gave the visitors the mythical key to the city, and Ex-Governor Edwin P. Morrow of Kentucky. The toastmaster, G. A. Williams, vice president of United Carbon Company, then introduced Rev. H. W. Rose "the spiritual advisor" of the company, who was followed by R. P. Dinsmore, chief chemist of Goodyear Tire & Rubber Company. He spoke on the increasing control of business by the government—a movement which he did not look upon with favor.

Other speakers were French Robinson of the Lycoming Gas Company. A B. Koontz, vice president, Charleston National Bank, Thomas W. Bowers of Bank of Manhattan Company, Roy St. Louis, former assistant U. S. Attorney General, W. B. Clark, Monroe, La., and

OSCAR NELSON

"Riley" Wilson, a well-known after dinner speaker. The final talk was by A. G. Treadgold, the company's sales manager who voiced his appreciation for the presence of so many guests and expressed the hope that they would profit from the exchange of ideas with others in the same field.

The last event of the evening was a dance at the Shrine Mosque Ballroom where many of the guests joined in helping the football team celebrate its victory.

The wives of a number of the guests were entertained by Mrs. Nelson while in town. In addition to attending the football game, the women enjoyed sightseeing trips followed by a dinner of their own at the Kanawha Hotel, and the dance at the Shrine Mosque Ballroom.

Start Tennis Shoes Survey

The Leather-Rubber-Shoe Division, Department of Commerce, Washington, D. C., has started its regular survey of dealers' stocks of tennis shoes. Approximately 90,000 dealers are involved in the survey which is conducted annually by the Division. On November 1, 1933, the Division reported 3,347,770 tennis shoes on hand with 15,014 dealers reporting.

NEW YORK GROUP CHRISTMAS PARTY

The New York Rubber Group, A.C.S., will hold its annual Christmas party and dinner on December 14 at the Building Trade Employers' Association club rooms, 2 Park Avenue, New York City. As usual, tickets are $2.00 per person. Hugh Herndon, who flew around the world several years ago with Clyde Pangborn, the first two fliers to cross the Pacific, receiving $25,000 from the Japanese government for accomplishing that feat, is scheduled as the only speaker for the evening. Mr. Herndon, now associated with the Cities Service Company, will speak on "Aviation—Its Part in Industry." A program of entertainment is also being prepared.

CALIFORNIA GROUP HOLDS ITS GOLF TOURNAMENT

The Los Angeles Group of the Rubber Division of the American Chemical Society held its regular quarterly golf tournament, spoken of as the fall tournament, at the Montebelle Country Club in East Los Angeles, October 13.

Thirty-two players competed for the Rubber Division trophy. The trophy was won by F. S. Pratt, general manager of the Pacific R. and H. Chemical Company, a Du-Pont subsidiary with plant at El Monte. The bogey prize was drawn by E. L. Royal, Pacific coast manager of the H. M. Royal Company.

The regular winter tournament will be held in January, possibly on the second Saturday.

A dinner meeting of the group was held on Thursday night, November 8, in the Richfield dining room in the Richfield building, Sixth and Flower Street, Los Angeles. The speaker of the evening was Edmund Billings of the Godfrey L. Cabot Company, who took as his subject, "Recent Developments in the Carbon Black Industry."

Annual election of officers will be held in December. The present chairman of the group is Paul Beebe of the Goodyear Tire and Rubber Company, and the secretary is W. R. Hucks of the B. F. Goodrich Rubber Company.

RUBBER CODE AUTHORITY PROPOSES AMENDMENTS

The Code Authority for the rubber manufacturing industry submitted for NRA approval on November 3 a group of proposed amendments to the present code. One of the proposed amendments calls for permitting sales below cost, prohibited by the present code, providing such sales are "in good faith in order to meet the competition of any other member." Other suggested amendments would bring the auto fabrics, proofing and backing, rubber footwear, mechanical rubber goods and the rainwear divisions under the master code's cost accounting and pricing provisions. Objections or suggestions to the amendments must be filed with Deputy Administrator J. H. Lenaerts, in Washington, prior to November 24.

NRA officials have approved customer classifications for the mechanical rubber goods division. "Cooperative Associations" are defined as syndicate buyers while a "consumer" is defined as "any person, firm, corporation or other form of enterprise other than industrials as hereinabove defined, which purchases the products of the Division for his or its own consumption and not for resale purposes."

Firestone Appeals Verdict

The Firestone Tire & Rubber Company, Akron, filed an appeal from the decision of District Judge Paul Jones, of Cleveland, which found the company to be infringing on patents covering the flat-band process of making tires, owned by the United States Rubber Company, New York City, on October 12, in the United States Circuit Court of Appeals, at Cincinnati, Ohio. Judge Jones' decision ordered the Firestone company to account to the U. S. Rubber concern for profits and damages. Cross appeal was also filed.

Replacement Sales of Tire Competitors Revealed by Goodyear Defense Attorneys

Confidential Reports Subpoenaed by Defendant in Government Anti-Trust Suit—Firestone Objects Strenuously—Goodyear Sales Manager Testifies

ANNUAL unit sales of the larger tire manufacturers and distributors were brought into the open for the first time in the history of the rubber industry during the course of the Government's anti-trust suit against the Goodyear Tire & Rubber Company, Akron, alleging unfair price discrimination in the latter's contract with Sears. Roebuck & Company. The heretofore unpublished records were subpoenaed by Goodyear defense attorneys in an attempt to definitely prove that the sale of tires in oil stations and company-owned stores has been more of a serious disturbance in the retail tire business than the invasion of the field by Sears-Roebuck retail outlets. The total tire replacement sales are reported annually in a lump sum by the Rubber Manufacturers Association, but were not revealed individually by company until introduced in the Goodyear case. Company records shown include those of Atlas, Sears-Roebuck, Goodyear, Firestone, Goodrich and U. S. Rubber.

The revelation of the tire replacement statistics (which are shown in table form for the years 1926 through 1933 elsewhere on this page) was only one of the many surprises occurring in the anti-trust suit which has already developed into the "biggest" case in the history of the Federal Trade Commission which brought the anti-trust charges.. To date 21,000 pages of testimony have been recorded. The Commission has introduced more than 200 witnesses and Goodyear attorneys have interrogated some 150 for the defense. There yet remains at least another month of hearing testimony before the case is concluded.

After a short recess from October 11 to October 22 hearings in the case were resumed in Akron before Commission Examiner John W. Bennett. Prior to returning to Akron, where early hearings were held, Goodyear had called upon dozens of dealers to present testimony to the effect that company-owned stores were guilty of trade practices disturbing to the industry and were a greater "menace" than Sears-Roebuck stores. Upon resumption of hearings, however, Goodyear called upon rubber manufacturing executives to further their defense.

Subpoenaed to produce its records in connection with its company-owned stores Firestone Tire & Rubber Company defied the right of the Commission to secure such records and refused to present such information. After several days of defiance by both Firestone Counsel Cletus Roetzel and S. F. Poor, sales manager, the records were finally reluctantly introduced. According to these records Firestone has 45 company-owned retail outlets and unit sales through all such sources between 1921 and 1933 ranged between 1,073,469 and 1,166,497.

R. S. Wilson, Goodyear vice president and sales manager, spent several days in the witness chair testifying in his company's defense. According to Mr. Wilson competitive interests forced the Goodyear company to establish its system of company-owned retail stores which now number 275. He was insistent in his statement that "Sears-Roebuck had nothing to do with it" but that competing companies forced the company to go "further than its desires" in this respect. He explained that the first half-dozen retail stores operated by the company were set up to furnish retail experience to their dealers. He also testified that most of the commercial business was handled by the dealers, with direct selling accomplished by the company in cases "where circumstances made it necessary." Sales of tires to state highway departments was cited as a necessary circumstance in this instance.

During his testimony Mr. Wilson denied the allegations that he had ever told government witnesses that Goodyear's second line tires and tires made for Sears-Roebuck were equal in quality and also of having told them that Goodyear sold tires to the mail order concern at prices below those quoted its own dealers. In describing the evolution of the so-termed Goodyear second-line tires he stated that they were placed on the market "to meet a certain price field" fully two years before it was deemed necessary to meet Sears-Roebuck competition.

Another Goodyear witness heard last month was J. E. Mayl, sales manager of the tire department, who contributed the information that the company does an annual business of $25,000,000 on "national accounts" which are given 10% lower prices than service stations. This witness outlined price wars in the industry and said he believed that dealers made about 20% of the sales price of tires in profits even during such "wars" because manufacturers always took price war conditions into consideration when selling tires to dealers.

Another point revealed during the testimony was the fact that Sears-Roebuck retail store employes are specifically instructed not to mention that the tires sold by them are manufactured by Goodyear. This was revealed by Lawrence E. Sexton, manager of the tire department for the mail order concern. He stated, also that in his belief the tires sold by Sears-Roebuck were as good or better than any of the so-called first line tires. With reference to the non-mention of Goodyear's producing tires sold in their stores Mr. Sexton claimed that many of the clerks "have been fined for using the name Goodyear in their sales talk." He also revealed that the company was approached in 1928 by Fisk Rubber with an offer to manufacture tires for less than Goodyear was selling them to his company.

Documents were also introduced during the Akron hearings to the effect that Sears-Roebuck paid between $9,250,000 and $10,000,000 of Goodyear's "constant overhead" between 1926 and 1933. Objections of Federal Trade Commission attorneys that the "constant overhead" was intangible and indefinite were overruled by Examiner Bennett. The introduction of this evidence was believed to have been one of the company's major efforts to prove the value of its contract with the mail order concern.

Annual Tire Replacement Sales 1926-1933

	Atlas	Sears	Goodyear	Firestone	Goodrich	U. S.
1926	.....	.....	1,089,923	(Unrptd)	4,867,574	3,885,631	2,778,312
1927	.....	.....	1,791,570	6,251,229	6,376,892	4,882,108	2,653,684
1928	.....	.....	3,247,463	7,670,376	5,849,269	5,367,383	2,915,104
1929	.....	51,456	4,379,667	8,166,755	5,176,284	4,884,889	3,002,749
1930	.....	612,328	3,462,858	7,784,010	5,528,806	4,584,310	2,638,119
1931	.....	1,663,972	3,238,016	7,370,331	5,528,806	4,276,658	2,716,018
1932	.....	1,278,646	2,525,892	6,510,235	5,013,553	3,179,305	2,440,498
1933	.....	1,741,417	1,842,724	5,400,430	4,355,077	3,318,705	2,520,650

Amazon Rubber Exports Increase

Rubber exports from the Amazon Valley during August, 1934 amounted to 710 long tons, bringing the total for the first 8 months to 5,247 tons as against 3,700 tons in the 1932 period, and 6,373 tons in that for 1933, according to a report from American Consul George E. Seltzer, Para, Brazil. There was little activity in the Para, Brazil, rubber market in August, and prices showed little change from the preceding month. Should exports continue for the rest of 1934 at the August rate, the total for the year would amount to about 8,700 long tons, which compares with 9,883 during 1933 and with 6,420 tons during 1932.

Rubber in Garter Is Scented

In an advertisement featuring hosiery by the McCallum Hosiery Company, New York City, and garters produced by Everett & Barron Company, Providence, Rhode Island, it is pointed out that "those invisible slips of scented rubber started it all." The garter, known in the trade as "B-Flat" is scented, thus removing all possible unpleasant odors.

Standard Chemical Moves

Offices of the Standard Chemical Company have been moved from 320 Beacon Journal Building to 609 Akron Savings & Loan Building, Akron, Ohio. The company manufactures chemicals for the rubber industry, and also acts as manufacturers agents.

NEW ENGLAND NEWS

The Omo Manufacturing Company, Middletown, Connecticut, maker of rubber garments for infants, which has been in existence since 1893, has been acquired by four individuals, Messrs. Seddon, Schnur, Epstein and Colt, all of Brooklyn, New York. These four men have been operating the Columbia Cement and Columbia Combing companies in Brooklyn and plan to move their operations to Middletown. Frederick B. Fountain, president and treasurer of the Omo concern, which at present employs seventy-five people, remains as a director of the company.

After the present buildings have been enlarged, additional machinery will be installed for the production of shoe fabrics, raincoat cloths, hospital sheeting, corset fabrics, gum rubber specialties and custom rubberizing, it is announced. A new building will be erected later for the manufacture of rubber cement, it is understood.

Production on rubber capes and coats will be speeded up to a capacity of 1,500 dozen a week, and other operations will be accelerated, according to Mr. Colt who is the new president. The rubber cement plant, now proposed, will have an area of 12,000 square feet, designed for a maximum production of 20,000 gallons a day.

Highly satisfactory results from the advertising campaign now being conducted by the Seamless Rubber Company, New Haven, Conn., for its Seamless Standard Surgeons' Gloves, are reported by Arthur Scrivenor, Jr., advertising manager. The campaign, now running in medical periodicals, was announced to distributors by means of an elaborate broadside.

Strikingly illustrated with action photographs, the advertisements feature the "skin-like fit" and "anatomical shape" of Seamless gloves, as well as the economy in their use resulting from wearing qualities which withstand frequent sterilization.

James A. Howarth, 85, former president of The Hoggson & Pettis Mfg. Company, New Haven Conn., maker of rubber workers' tools, cutting dies, molds and engraved calender rolls, died October 16 at the home of his son, Harry A. S. Howarth, in Philadelphia, Pa. Mr. Howarth joined the New Haven company as secretary in 1890, and later with Harry B. Kennedy, Frank Willis, George Stevens and two others reorganized the business and became its president. He held that position until he sold his interest and retired in 1910. Three sons, Harry, Thomas and James, survive him.

Firestone Rubber Footwear Co., Hudson, Mass., has resumed operation of its plant after the annual shutdown for inventory purposes. The inventory was begun October 24.

Approve Complaint Committee

The National Recovery Administration, on September 25, approved the membership of the Complaint Committee of the Rubber Manufacturing Industry. The members include: T. J. Needham, U. S. Rubber Company; H. N. Young, Hamilton Rubber Manufacturing Company; M. I. Woythaler, Hodgman Rubber Company; and Paul Cherington, administration member.

Dunlop Raises Tire Price

Dunlop Rubber Company, England, has announced an increase of 10 per cent in the price of its giant-size tires. While this type tire represents only a small portion of the company's output, it is believed that like rises will soon be applied to its general line.

Fire At Barr Factory

An explosion in the curing room of the Barr Rubber Products Company, Sandusky, Ohio, on September 25, resulted in a fire which lasted more than an hour before being subdued. Damage was not of serious proportions. Two employees were overcome by sulphur fumes caused by the explosion.

Export Office for Black Rock

To facilitate handling of its increasing export business the Black Rock Manufacturing Company, Bridgeport, Conn., manufacturer of rubber cutting machinery, has opened an export office at 277 Broadway, New York City.

Goodyear in Water Dispute

Goodyear Tire & Rubber Company late last month served notice in writing to Akron city officials that it was transferring its production to its other plants as fast as water facilities fail to meet the requirements of the large East Akron factories. This notice was served in connection with Goodyear's 29-year old dispute with the city on water charges. The company claims that it is "unable" to pay 1½ cents per thousand gallons for water, while the city contends it is not in a position to supply such gallonage even at that price unless East Akron manufacturers guarantee consumption on an all-year average which will enable delivery to be made at the present 1½ cent price. Goodyear has fought since 1905 for a water supply that would offset the advantage enjoyed by both Firestone and Goodrich in South Akron.

Purchase Northern Rubber Co.

Sam Kay & Company, Akron, purchased the plant and property of the old Northern Rubber Company, of Barberton, Ohio, on October 20. The sale price was not revealed. It is not known whether the plant will be continued as a rubber factory or transformed into another manufacturing site.

Rubber Exports Show Gain

Exports of rubber goods during the first nine months of 1934 gained 38% over the same period of 1933. Total shipments were valued at $16,547,214. A decline of 10%, however, was shown in September as compared with the preceding month.

LOS ANGELES NEWS

The seventeen members of The California Rubber Manufacturers' Association held their fiftieth meeting at the Jonathan Club in Los Angeles late in October to discuss matters relative to codes and code enforcement. It was agreed that progress had been made in arriving at workable bases locally.

Charles M. Merralls, president of the Rubbercraft Corporation of California, Ltd., who is president of the association, states that the association has in its three years of life accomplished to a large extent its primary aim, that of creating a better feeling among the rubber manufacturers. The club holds a monthly get-together where outside speakers are heard and where local problems of co-operation and competition are discussed. "One very good thing accomplished," says Mr. Merralls, "is the bringing about of a better understanding between the so-called 'independents' and the four so-called 'majors' operating in this territory and maintaining factories in Los Angeles."

A lineman's protector, the feature of which is a double apron which prevents water from seeping in and establishing a short circuit, is now being manufactured in Los Angeles for The Insulator Products Company by Rubbercraft Corporation of California, Ltd. The protector is used on high voltage wires to protect workmen. It is an addition to a line of rubber items used in the power transmission field.

Swimming and boating races in southern California coast waters are now being directed by rubber buoys which replace metal buoys. This does away with the chance of injury to swimmer or to boat in case of collision with a buoy. The buoy is held in place by an anchor and held upright in the water by sand ballast. Patent has been applied for by Rubbercraft Corporation of California, Ltd.

Soft, pneumatic, circular air cushions which snap on to office stools, motorman's stools, etc., have appeared in Los Angeles, the patent of a local factory owner.

A serving tray with hard rubber sides and soft rubber bottom guaranteed not to scratch the most highly finished dining table is being manufactured locally. It is the patent of a local manufacturer.

Four thousand square feet of concrete floor space and six presses, have been added in expansion programs at the Torrance factory of Rubbercraft Corporation of California, Ltd. The number of employees has been increased 25 per cent and the building and grounds much improved. The enlargement in plant equipment and personnel has been made necessary by the large number of new items put under manufacture. The work is now practically completed, according to Charles M. Merralls, president.

DOMESTIC PRODUCERS PROTEST ERASER IMPORTS

Domestic manufacturers of erasers have filed vigorous protests with the National Recovery Administration regarding the increasing imports of that product from Japan. The complaint, directed against all types of rubber erasers, was filed with the authorities by A. L. Viles in his capacity as chairman of the Rubber Manufacturing Industry Code Authority which includes in its membership 100 per cent of all domestic manufacturers of erasers.

The principal port of entry for the Japanese product is New York City. Therefore, it is logical that manufacturers with locale in and around that city are interested in the complaint, including such companies as American Lead Pencil, A. W. Faber, Inc., Weldon Roberts Rubber and Eagle Pencil. The B. F. Goodrich Company, Akron, is also active in seeking relief in this connection.

According to the filed complaint, Japanese erasers of larger size than those manufactured domestically are being sold at the same retail prices. The increasing imports are said to be attributable to the fact that rising costs of rubber and higher labor costs in this country do not enable domestic manufacturers to compete on an even scale. It is believed that an investigation by the Tariff Commission will be ordered, and action taken thereafter to protect domestic producers under code operation.

Strike at Wilson Rubber

As a result of labor difficulties, the plant of the Wilson Rubber Company, Canton, Ohio, was shut down on October 22 when 175 workers went out on strike. Terms of a new contract which employes are trying to negotiate with the company is involved in the walk-out. Charges were made by F. J. Wilson, president and general manager of the company, to the effect that the walk-out occurred before the company had given its answer to proposals for a new contract while the laboring body claimed that six weeks notice was given the concern prior to the strike. The entire matter has been laid before the Regional Labor Board, at Cleveland, of which Ralph Lind is chairman.

Set Rubber Quota at 75%

After several weeks of conferences held in London the International Rubber Regulation Committee, on November 2, set the amounts of rubber exportable by producing nations in the first three months of 1935 at 75% of the "basic quota." As the basic quota, as it is known, for 1935 is higher than that for the current year the amount actually exportable will be about 82% of the 1934 basic quota against 70% in December and 80% in November. The basic quota is estimated on the volume that might have been shipped were there no restrictions. The British faction held out for a lower quota rate but the Dutch element was adamant and finally succeeded in having the 75% quota agreed upon.

Loewenthal Building Addition

Loewenthal Company, scrap rubber dealers, started construction last month on an addition to its present Akron factory and also on a new office building.

Goldenrod Experiment

Carrying on the Edison experiments to extract rubber from the goldenrod plant, the Department of Agriculture has established an experimental station at Glendale, Maryland. Careful measurements are recorded of the growth of the plants under varied weather conditions. The above reproduction depicts a field of goldenrod of the *Solidago Fistulosa* species. This species, according to the Department of Agriculture, has analyzed as high as 9% rubber. It has been pointed out, by other sources in the rubber industry, that the rubber in goldenrod is confined entirely to the leaves and that the weight of these leaves forms but a small portion of the plant's total weight. Additional experiments are being conducted on other types of goldenrod as well as unrelated plant species.

Long Heads New Division

Ault & Wiborg Corporation, 75 Varick Street, New York, a subsidiary of the International Printing Ink Corporation, recently announced that it had absorbed the Coatings Corporation and the Republic Varnish Enamel & Lacquer Company, and also that S. S. Long, for many years president of these companies, has become Director of the Rubber Goods and Textile Division. This division will conduct research on industrial finishes especially as it applies to lacquers and other finishes for rubber footwear, toys, etc. It is expected that with the increased technical and manufacturing personnel now available, and the enlarged facilities for investigation and fundamental research, new developments in industrial finishes will be made available shortly to rubber manufacturers.

Seeks Eastern Manufacturer

C. E. Bridges, 1042 Gardena Avenue, Long Beach, California, who recently applied for a patent on a rubber covered coat hanger, and who is now producing that item on the West Coast, is interested in making contact with either a garment maker manufacturer or some concern engaged in rubber dipping in the East. Mr. Bridges is anxious to place patent rights on the manufacture of his rubber coat hanger with such an Eastern manufacturer on a royalty basis. Dresses cannot slip off these hangers because of the rubber covering.

STRIKE IS SETTLED AT AMERICAN HARD RUBBER

By an overwhelming vote of 197 to 17 striking employes of the American Hard Rubber Company decided on October 26 to return to work in the Akron plant of that company, ending a strike that was called on August 21 and which lasted nine full weeks. Work was resumed on Monday, October 29, but full production was not scheduled for several weeks due to loss of orders during the strike. Company workers decided, finally, to accept the oft-rejected two-cents-an-hour pay raise, claiming major victories on other items including seniority rights.

During the course of the strike the American Hard Rubber concern threatened to move from Akron after strikers repeatedly turned down conciliatory measures offered by the company.

On October 17 the company filed a suit seeking a temporary injunction to restrain strikers from interfering with operations or removal of equipment from the plant. On October 17 Federal Judge Paul Jones, in Cleveland, denied the request for the temporary injunction and set a hearing date in November on a petition for a permanent injunction. The ending of the strike saw an immediate withdrawal of the suit.

Cord Tire Settlement Near

Conferences between L. A. Smith, trustee in bankruptcy, and Judge W. E. Baker, held recently, indicate an early settlement in the case of the Cord Tire Company, Chester, West Virginia. An equity case pending in this instance has held up final settlement of the bankrupt tire concern for many years.

TRENTON NEWS

The Thermoid Company, Trenton, is erecting a power house addition and building a new automatic 160-foot concrete chimney. Two 300 horse power water tube boilers and automatic stokers are being installed. The work is being done by the Combustion Engineering Co., of New York, and will cost $50,000.

The Murray Rubber Company, Trenton, is now handling batteries and spark plugs in addition to tires and tubes in the hope of boosting trade.

Trenton rubber manufacturers have been notified of a reduction in freight rates on several of their products by the railroads east of the Mississippi. The reduction, which affects hose, belting, fruit jar rings and tubing, followed a conference between railroad officials and George E. Mace, traffic manager of the Trenton Chamber of Commerce. The reduced rates are on less than car load quantities of 10,000 pounds or more.

Filing of an application by the Thermoid Company, Trenton, for registration of $1,416,168 in securities it proposes to issue, has been announced by the Securities and Exchange Commission at Washington. The concern is a holding company owning all of the outstanding stock of the Thermoid Rubber Company, Thermoid Textile Company, and the Woven Steel Hose and Rubber Company, and substantially all of the outstanding stock of the Southern Asbestos Company.

Names in the News

R. B. KOONTZ, formerly general manager of Adamson Machine Company, and more recently with the Universal Engineering Corp., is now acting as engineering and appraisal consultant on machinery in addition to dealing in new and used equipment. Offices are located at 109 North Union Street, Akron.

NOELE R. MILLER, formerly manager of Goodyear Plant 1, Labor Department, sailed last month on the Mariposa for Sydney, Australia, where he will act as personnel manager in the Goodyear plant at that point. E. W. MACHAN, present personnel manager at Sydney, will transfer to Akron upon Mr. Miller's arrival.

ROGER W. ANDREWS, formerly assistant to the president of the Blaw-Knox Company, has been appointed western manager of the Combustion Engineering Company, Inc., New York City. He has been associated with the company since September 1.

H. B. BURNSTINE has been appointed special representative for the Pioneer Rubber Company, Willard, Ohio. He is specializing in the map of the world, an inflatable globe made of heavy latex, featured by the concern. His headquarters are at 1150 Broadway, New York City.

FERN HARRISON, crude rubber buyer for the Goodyear Tire & Rubber Company, Akron, stationed at Singapore, is now visiting the United States on a six-month leave of absence. He has been with the company since 1914.

JOHN ALVAREZ, Grasselli Chemical Company, has been selected to head the Salesmen's Association of the American Chemical Industry as president. JACK LEPPART, Columbia Alkali Works, is the new vice-president. Both have held executive positions in the organization.

JAMES A. EVANS, long associated with the Seiberling Rubber Company, Barberton, Ohio, is running for the post of county treasurer in that city. His activities include social and political work of varied nature. He is a graduate of Akron University and the University of Chicago.

DR. HERMANN VON SCHRENK, consulting timber engineer of St. Louis, was elected to the presidency of the American Society for Testing Materials on October 9. Formerly senior vice-president, he was elected to the higher post by the executive committee of the organization to fill the post left vacant by W. H. Bassett, who died last July.

V. G. VAUGHAN, formerly manager of the Appliance Engineering Division, Westinghouse Electric & Manufacturing Company, has joined the Spencer Thermostat Company, Attleboro, Mass., in the capacity of manager. The company manufactures thermostats and additional temperature control devices.

T. A. BEAZLEY, factory manager, British Tyre & Rubber Company, Ltd., Leyland, England, was in Akron last month attending a series of conferences with factory officials of B. F. Goodrich Company. He left for England on November 6.

Mohawk Rubber Makes Changes

Mohawk Rubber Company, tire manufacturers of Akron, recently made several important changes in its personnel. Edwin B. Self was appointed advertising manager succeeding J. B. Mills, resigned. H. S. Sutton is the new sales manager. New appointments of branch managers were announced including Pete Goodall for the Akron territory, Tom Schmitt in the southwestern division, while L. J. Robinson, who has been with the company for ten years, was named assistant branch manager for New York. W. R. Kuhn is manager of the New York branch.

PAUL W. LITCHFIELD, president, Goodyear Tire & Rubber Company, Akron, delivered an address on "What About the New Deal" before approximately 1,000 foremen at Goodyear Hall on October 27. The occasion was the fourth semi-annual conference of the Western Reserve Association of Foremen's Clubs.

DAVE SULOFF, final finish department, B. F. Goodrich Company, Akron, tire division, was the guest of honor at a dinner given by supervisors in his department, on October 27, at Young's Hotel. Mr. SULOFF is the oldest factory employe of the company on active duty.

HUGH ALLEN, former director of public relations, Goodyear Tire & Rubber Company, Akron, has returned to the publications office at the Akron plant after spending several months at the Los Angeles branch of the company.

L. L. SOWERS, district manager, B. F. Goodrich Company, with headquarters in Indianapolis, was notified last month of his appointment as a colonel on the staff of Governor Ruby Laffoon of Kentucky. Mr. SOWERS has been with Goodrich for 20 years.

E. E. HELM, public relations director, General Tire & Rubber Company, Akron, attended several meetings last month to formulate plans to free more than a million dollars of sequestered Akron money, augmented by a like amount of Federal funds, in an Akron-wide home renovizing program.

RUSSELL E. GREEN, time study and standards department, B. F. Goodrich Company, tire division, delivered an address on "Motion Study Technique in a Vocational Education Program" before members of the Northeastern Ohio Teachers' Association on October 24.

D. M. WILHELM, who has been sales manager for the past four years of the Patterson Foundry & Machine Company, East Liverpool, Ohio, was elected secretary of that company last month. E. M. UNDERWOOD has been appointed sales manager.

N. A. PIERCE has been appointed division operating manager for the B. F. Goodrich Company, Akron. His headquarters will be maintained in Minneapolis. He has been with Goodrich since 1929.

GOODYEAR MAY LEASE PANAMA PLANTATIONS

Another forward step to free the United States from practically complete dependence upon foreign interests for its rubber supply is expected to be consummated in the very near future when negotiations may be concluded between the Goodyear Tire & Rubber Company, Akron, and the government of Panama. Present plans call for the establishing of a vast American-controlled rubber plantation in the Panama territory Negotiations calling for a long-term concession from Panama have already reached the final stages, it is reported.

It is believed that the agreement sought with the Panama authorities will give Goodyear the sole right to cultivate and develop rubber in that republic. Goodyear experts have concluded a number of tests and experiments on Panama soil which are said to have proved highly successful. Once negotiations are completed the Akron manufacturer is prepared to start cultivation immediately on a large scale. If the plan works successfully the cost of future shipments of rubber to this country will be made at a lower rate than heretofore possible.

No agreement is said to be involved between the government of Panama and the United States. Goodyear is acting as an independent agent, although it is understood that the scheme has the full sanction of Washington officials.

Announce New Dustless Black

A new dustless black, in pellet form, known as "Kosmobile," has been announced by the United Carbon Company, Charleston, West Virginia, makers of Kosmos, Dixie and Triangle brands of carbon black.

Obituaries

Ernest Jacoby

Ernest Jacoby, well known dealer in crude rubber and compounding materials, died suddenly on October 22, in Boston, Mass., where he had maintained his office and home for many years. Born in England, he came to this country 30 years ago and has been associated with the rubber industry for that length of time. In addition to his business activities Mr. Jacoby was a civic leader. He founded the Jacoby Club in Boston which has carried on the work of helping men who had lost their grip on life. In the past he was associated with the Exchange Club, City Club and Chamber of Commerce, all of Boston. He leaves a widow, two sons and a daughter.

Mrs. Godfrey L. Cabot

Mrs. Maria Moors Cabot, wife of Godfrey L. Cabot, carbon black manufacturer of Boston, died at her home, 242 Beacon Street, Boston, after a long illness, on November 6. She was 69 years old. Founder of the National Woman's Republican Club, Mrs. Godfrey was actively engaged, up to her death, in social and civic affairs. Her activities included participation in many charitable enterprises. She was married to Mr. Cabot in 1890. Surviving, besides her husband, are two sons, a daughter, a sister and three brothers.

Financial News

MONSANTO CHEMICAL CO. VOTES EXTRA DIVIDEND

Profits of the Monsanto Chemical Company, St. Louis, for the third quarter were approximately $566,195 or 65½ cents per share on the 864,000 shares outstanding, according to the quarterly statement issued on October 26. Profits for the corresponding period last year were $680,757 or 78½ cents a share, giving effect to the two for one split made last spring. The report states that increased efficiencies were unable to offset higher labor and other costs and smaller volume of sales during the third quarter.

Earnings for the nine months were $1,945,230 compared to $1,519,704 for the same period in 1933. Prorated, the 1934 earnings amounted to $2.25 a share, which compares favorably with $1.76 a share, giving effect to the two for one split, for the nine months period last year.

Directors of the company at St. Louis have declared an extra dividend of 25 cents, in addition to the regular quarterly dividend of 25 cents on the capital stock, both dividends payable December 15 to stock of record November 24, 1934.

Concerning the recent financing of Monsanto's British subsidiary, Edgar M. Queeny, president, stated: "During September our British subsidiary, Monsanto Chemicals, Limited, sold 400,000 pounds of an authorized issue of 500,000 pounds of 5½% non-voting, cumulative preferred stock. The issue was offered at 2½% premium and was heavily over-subscribed. The favorable terms of this financing involved no guarantee by the parent company nor sinking fund requirements, but provided an option to the company to call the issue between 1940 and 1970 at a premium of 7½%.

"The proceeds will be used in part to expand our British properties, but the major portion will reimburse the treasury of the parent company for past expenditures in England and will finance additions and extensions to the company's American properties."

RUBBER REGENERATING CO. OF BRITAIN REORGANIZED

Details have been published in London recently, to comply with the Stock Exchange regulations, of the Rubber Regenerating Co., the business of which is rubber reclaiming. It was formed as a private company in 1909, and was recently converted into a public company. Of the authorized capital of £220,000 ($1,100,000) there are in issue 210,100 shares of £1 each and 500 management shares.

The company recently acquired from Kaycee, Ltd., in exchange for the allotment of 80,000 £1 shares, certain inventions and chemical processes, the rubber reclaiming business, plant, and machinery of Thames Hard Rubber Corporation, and the right to manufacture and sell chemicals under agreement with the United States Rubber Company.

The board of the company consists of Francis Norman Pickett, chairman (managing director of Kayee, Ltd., and the Thames Hard Rubber Corporation), William Gilbert Essex, managing director, Elmer Roberts (vice-president of the United States Rubber Co.), Harold Charles Cowen (member London Stock Exchange), and William Pocock (director of Percy Tarbutt & Co., Ltd.).

UNITED CARBON COMPANY REPORTS 9-MONTH PROFIT

United Carbon Company, and subsidiaries, Charleston, West Virginia, reported net profit of $988,413 after taxes and additional charges, on November 5, for the nine months ending September 30, 1934. After payment of dividends on the 7% preferred stock, which was called for retirement on July 1, this is equal to $2.53 per common share compared with $1.06 per common share in the like period of 1933 based on net earnings of $479,647 for the 9-month period.

After all charges, the net profit earned for the third quarter of the year by the company was reported at $318,040, equal to 86 cents per share on the common stock, against net profit of $360,510, or 90 cents per share, in the preceding quarter. For the same period in 1933 earnings were $178,916 or 40 cents per share.

According to the report, current assets as of September 30, including $788,338 in cash, amounted to $2,694,680, with current liabilities listed at $541,620. This is slightly lower than current assets of $3,523,837 reported in 1933, while liabilities have been reduced from the $567,974 shown in last year's report.

Lee Rubber Expects Dividends

According to John J. Watson, president, Lee Rubber & Tire Company, Conshohocken, Pennsylvania, who is also chairman of the board, the company expects to pay dividends exceeding $1.00 per share on all common outstanding stock on the basis of results to date and net profit already recorded. This payment will be exclusive of company treasury stock.

Boston Woven Hose Has Profit

For the year ending August 31, 1934, the Boston Woven Hose & Rubber Company, Cambridge, Mass., shows a net income of $13,853, after all charges and deductions including depreciation, taxes and expenses. This is equal to 80 cents a share on 86,000 common shares after the payment of 6% preferred dividends. In the previous year the company paid 12 cents per common share on the earnings of $54,991.

Preferred Goodyear Dividend

Directors of the Goodyear Tire & Rubber Company, Akron, meeting in Cleveland on October 23, authorized a dividend payment of $1.00 per share on preferred stock. The dividend is payable January 2, 1935, to stockholders of record December 1.

FAULTLESS RUBBER CO. SHOWS PROFIT FOR YEAR

Faultless Rubber Company, Ashland, Ohio, reports net profit for the fiscal year ending June 30, 1934, of $204,163, after depreciation, federal taxes and all other charges. This is almost double the net income earned by the company in the preceding year and is equal to $3.11 a share on 65,450 shares of capital stock.

In the preceding fiscal year net profit was recorded at $121,964 or $1.67 a share on 72,722 shares of stock. The current report shows current assets as of June 30 of $768,520 with current liabilities listed at $119,058. Assets in the report for the preceding year were listed at $883,873 and liabilities at $104,719.

Approve Dayton Rubber Plan

A recapitalization plan, intended to simplify the capital structure of the company, and place the stock in a more favorable position for dividends, was approved by a 75% majority of the stockholders of the Dayton Rubber Manufacturing Company, Dayton, Ohio, according to John A. MacMillan, president, on October 26. Under the plan arrearage on the old cumulative preferred stock is wiped out. Application has been filed to continue the new stock on the Chicago Stock Exchange, where the old shares were listed. Stockholders have been advised in regard to exchange of the old stock for new certificates.

Goodrich Cancels Miller Stock

B. F. Goodrich Company, Akron, through the Bankers Trust Company, served notice on the New York Stock Exchange on October 11 that, under the mortgage and deed of trust for that company, the Bankers Trust Company released to Goodrich for cancellation 10,000 shares of capital stock of the Miller Rubber Company, a subsidiary. A supplemental indenture was also filed with the Exchange subjecting to lien all property acquired by the Goodrich company from the Miller company on June 30.

Fisk Income Is $474,271

Fisk Rubber Corporation, and subsidiaries, Chicopee Falls, Mass., report net income after charges and Federal taxes of $474,271 for the nine months ending September 30, 1934. Net income for the six month period ending June 30, 1934, was $372,768 after all charges which was equal to 57 cents a share per common stock. In a separate account signified as "export accounts in liquidation" for the nine month period, the company reports a net loss of $30,142 which was transferred to reserve account.

Request Special Meeting

A request has been filed with the management of the Kelly-Springfield Tire Company, New York City, for a special meeting of stockholders on November 19. The request was filed by the stockholders protective committee of the company which claims to have received proxies in excess of 35% of the outstanding stock entitled to vote. It is the purpose of the committee to effect changes in the management of the company at the special meeting requested.

New Rubber Goods

Rubber in "Pig" Novelty

The "Three Little Pigs" motif has been again put to use in the toy novelty field. H. Fishlove & Company, Chicago, have introduced an animated toy featuring the Walt Disney characters which seem to dance, sing and play. The ani-

mation is controlled by a strong spring motor which is easily wound up. The motor is controlled by a lever which sets it in motion. As the springs revolve the piglets move and sway in keeping with the movement. The bodies of these pigs are constructed of a special jelly-like composition in which rubber plays a prominent part.

All-Rubber Everdur Dolls

Consisting of four parts—body, head, arms and legs—the Everdur Rubber Dolls are the first to make their appearance completely made of rubber eliminating all springs, wires, elastics, wood or metal parts, according to the Schavoir Rubber Company, Springdale, Connecticut. The parts are so shaped that they fit together firmly. There is nothing to rust, corrode or wiggle loose,

thereby assuring durability and longevity. A realistic flesh tint finish has been given these new dolls, which are covered by patents protecting the design and construction.

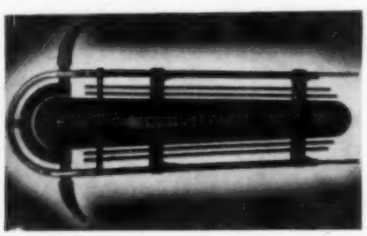
Miller "Baby Glee" Doll

Miller Rubber Products Company, Akron, division of the B. F. Goodrich

Company, has added another model to its doll line. The new model has been christened "Baby Glee." It is an all-rubber doll with the head made of hard rubber and the body made of soft rubber. Movable glass eyes are another feature. Even when completely submerged, water will not hurt "Baby Glee" models.

Sled Uses Rubber Grips

The latest model in sleds, conforming with the trend toward streamlining in automobiles, trains and airplanes, the Sno-Plane has been introduced by Skippy Racers, Inc., Toledo, Ohio. The steering bar on this deluxe model is equipped with rubber grips. The Sno-Plane is



constructed on a new principle. There are three runners instead of the usual two. The regulation side runners come up and are bolted into a semi-circular chrome tube which runs around the front of the sled. This forms a separate table to which the third, or center, runner is attached. The chrome tube is slotted to allow the steering handle, equipped with rubber grips, to project through it and to permit it to move easily. The rubber grips are important in this latter respect.

Door Stops Use Rubber

P. & F. Corbin, New Britain, Conn., is featuring a line of door stops equipped with rubber bumpers. The one illustrated, shown in both unassembled and complete

form, is small and inconspicuous. Its overall dimension is 1 x ⅞ inches, with a projection of ⅝ of an inch. Made of cast bronze the stop is so constructed that the screw for attaching is completely concealed when applied. The company's complete line of door stops is equipped with rubber tips. They are adaptable for applications where doors swing backwards against bathtubs, lavatories, radiators, or other objects.

Molded Hard Rubber Cases

With the exception of one model all of the recently-introduced new Exide Battery models are contained in cases of one-piece moldings of hard rubber. Two types are finished in dull lacquer tops and sides giving them an especially rich appearance. These new Exide cases are modern in every sense of the word without being "modernistic." Panels on the back, front and ends of the cases are recessed, presenting an attractive effect, and at the same time protecting the lettering on the panels against scratches and disfigurement due to shipping and handling.

Nipple Has Heavy Rubber Base

Patented by the Davidson Rubber Company, Boston, Mass., a new type of No-Colic nipple has made its appearance. The basic improvement of the new nipple lies in a heavy, firm rubber base, molded with and made part of the nipple proper. This base carries internal screw-threads by which it is tightly screwed on to the neck of the nursing bottle, the neck of which is also threaded. The rubber base prevents collapse of the nipple, cracking and split-

ting of the rubber, due to excessive stretching, is eliminated, and less danger of smashed bottles results. A survey among mothers is said to have indicated a wide preference for the new screw-on type of nipple.

REVIEW SHELF

• Monthly Review of New Books, Pamphlets, Company Catalogs, Service Bulletins, House Organs, etc., Pertinent to the Industry.

1934 CHEMICAL ENGINEERING CATALOG. 19TH ANNUAL EDITION. Published by Reinhold Publishing Corporation, 330 West 42nd Street, New York City. 780 pp.

Increased in size and comprehensiveness the 19th annual edition of the Chemical Engineering Catalog, which is officially approved by four chemical organizations, including the American Chemical Society, known as the Process Industries' Catalog, contains sections devoted to chemicals, general plant equipment, raw materials, construction materials, special process equipment and a section devoted to technical and scientific books. As usual the catalog contains a trade name index and an index of chemicals, equipment and supplies. It is a reliable source of information to the rubber trade.

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VARIATIONS IN THE COMPOSITION OF LATEX FROM CLONE AND SEEDLING RUBBER. By J. L. Wiltshire. Published by the Rubber Research Institute of Malaya, Kuala Lumpur, F.M.S. Bulletin No. 5. $1.00 (Straits).

In 1931 the scientific staff of the Rubber Growers' Association established several clones on the Pilmoor Estate, Selangor. The experimental results recorded in this book are based on a study of the rubber from these clones since July of that year. Changes in the composition of latex induced by various systems of tapping is of considerable importance in relation to the quality or properties of the latex and raw rubber obtained therefrom when applied to the manufacture of rubber goods. Mr. Wiltshire discusses the results of tests on different systems of tapping on the clones planted for experimental purpose on the Pilmoor Estate.

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ASHCROFT AMERICAN GAUGES. Distributed by Consolidated Ashcroft Hancock Company, Bridgeport, Conn. Catalog 1000. 32 pp.

A wide variety of indicating and recording gauges manufactured by the Consolidated concern is displayed and described in this latest catalog. Gauges of all types and styles are illustrated, accompanied by general specifications and prices. The catalog also describes the various types of gauges now used in the industrial world.

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THE FARM CHEMURGIC. By William J. Hale. Published by the Stratford Company, Boston, Mass. 201 pp.

Describing chemurgy as the "handmaiden of nature," the author, a research consultant for the Dow Chemical Company, gives us a new angle on the lowly farm, depicting it as the great chemurgical plant. "Production and consumption of worldly goods must be in strict accordance with nature's living output" and "it is on such principles that we can build and manufacture to our heart's content," is the manner in which Mr. Hale handles both his English and the farm. The various chemical substances furnished by Dame Nature are excellently described in this latest addition to chemical literature, ranging from the simple to the complex. The author delves deeply into the economic background of the farm, also discussing its future possibilities.

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REBUILT TIRE JOURNAL. Vol. 1, No. 1. Published by the Atlas Publishing Company, 150 Lafayette St., New York, N. Y.

The first issue of a new trade publication devoted, as its name indicates, to the tire rebuilding industry. This first edition contains articles by Irving Jay Fain, president of Apex Tire, Inc.; M. Zimmerman, sales manager, Milhander Rubber Company; E. P. Sarrail, Sarrail Tire & Rubber Company; and others. It also contains a patent section and a trade section listing various products pertaining to tire rebuilding and sources of supply.

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THE FUTURE OF RUBBER: WHITHER AND HOW? By C. F. Dawn. Published by Walter Jenn, Ltd., 203 Great College Street, N.W. 1, London, England. 24 pp. One Shilling.

The author, who has participated in the planning and formulating of rubber regulation schemes dating back to the early years of the current century, reviews the prospects of the restriction scheme now in operation. He carefully weighs the *pros* and *cons* pointing out the dangers of over-optimism and picking out the flaws. Mr. Dawn gives us figures in his pamphlet which fully depict the tremendous task of enforcement particularly involving the Netherland East Indies. With rubber trees controlled by native planters amounting to between 600 and 1000 million the native farmers alone can supply twice the needed annual supply.

THE USES AND CONTROL OF NATURAL UNDERGROWTH ON RUBBER ESTATES. By W. B. Haines. Published by the Rubber Research Institute of Malaya, Kuala Lumpur, F.M.S. 24 pp. $1.00 (Straits).

The definition "forestry method of cultivation" has been given to an aspect of the cultivation of the rubber tree which is essentially a soil problem. This booklet was compiled by the author as an attempt to meet the present demand for information as to the details of the new methods of so-called "forestry" cultivation of rubber. It defines the points upon which planters may judge for themselves as to the relative values of the "weeds" on their individual estates.

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LIBERIA REDISCOVERED. By James C. Young. Published by Doubleday, Doran & Company, Inc., Garden City, New York. 212 pp. $1.50.

"We have only enough rubber in warehouses to operate our 24,000,000 motor vehicles three to six months," points out the author in stressing to what an extent America is dependent upon foreign sources for rubber. It was realization of this total dependency during the Stevenson Restriction Scheme that started Harvey S. Firestone, Sr., on his quest to seek an independent source of rubber supply, free of foreign domination. His search, as is well known, led him to Liberia, where today Firestone maintains thousands of acres of rubber trees. The trials and tribulations besetting Messrs. Firestone, *et al*, are picturesquely described in "Liberia Rediscovered." The book provides an authoritative record of the little known negro republic over which America maintains a "moral" protectorate, since, in addition to Firestone's efforts, it depicts the life and mannerisms of the native Liberians.

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ACHEMA JAHRBUCH. 1931-1934. Edited by Max Buchner. Published by Deutsche Gesellschaft fur Chemisches Apparatewesen, Seelze bei Hannover, Germany. 233 pp.

A chronological review of chemical apparatus manufactured in Germany in the years 1931-1934 together with their uses. Brief biographies of German chemists who have helped make chemical history from 1809 to 1925 are also contained in the year book, the first published by the company since 1930. The book is written in German.

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OUT OF THE TEST TUBE. By Harry N. Holmes. Published by Ray Long and Richard R. Smith, Inc., 79 Madison Avenue, New York City. 373 pp. $3.00.

Intended as supplementary reading for students of chemistry, Dr. Holmes, the author, Professor of Chemistry at Oberlin College, and a Past Division Chairman of the American Chemical Society, has succeeded in making this book easy and pleasant reading. He describes vividly the chemist's battle to outwit the forces of nature and stresses the point that this is the Age of Chemistry rather than of machinery. Two chapters are briefly devoted to rubber, one discussing the early days of Macintosh and Goodyear and touching on Firestone's Liberia plantations and Ford's Brazilian properties, while the other concerns itself with decomposition products of rubber, particularly isoprene. The book gives both the student and the experienced chemist a clear-cut view of chemistry's dramatic background.

MARKETS

RUBBER—COTTON AND FABRICS—CHEMICALS

NEW YORK, NOVEMBER 9, 1934

Crude Rubber

DUE to the unloading of stocks by speculators convinced that inflationary movements in this country are over, the price of crude rubber was held down during the past month. The price on the Exchange today, 13.25 is just 25 points below the 13.50 price reported on October 8, one month ago. Spot high for the month was 14.43 on October 11, while low for the month was reached on the 31st at 12.88. The pendulum swung between 155 points. The most drastic drop in the month was recorded on November 3rd when, after a recovery drive of several days duration, prices broke 45 points below the preceding days price of 13.60. This break was attributed to the disappointment felt in the market on the announcement of the International Restriction Committee setting the quota for 1935 at 75% of the basic quota. A much lower percentage was looked for by sellers. Quotations in the outside market, Exchange, London and Singapore follow:

As of November 8

Plantations—			
Ribbed Smoked Sheets—			
Spot	—	@	.13¼
December	—	@	.13⅜
Jan.-Mar.	—	@	.13½
Apr.-June	—	@	.13⅝
First Latex, crepe spot	—	@	.14⅛
Amber Crepe, No. 2	—	@	.11¼
Amber Crepe, No. 3	—	@	.11
Amber Crepe, No. 4	—	@	.10¾
Brown Crepe, clean thin	—	@	.11⅛
Brown Crepe, rolled	—	@	.09¾
Latex—			
Liquid Latex, per gal.	.55½	@	—
Paras—			
Up-River, fine	—	@	.10
Acre Bolivian, fine	—	@	.10¼
Balata—			
Block, Ciudad	—	@	.44

LONDON MARKET

Standard Smoked Sheets—Buyers—Nov. 8			
November	—	@	6 7/32d
Jan.-Mar.	—	@	6 9/32d

SINGAPORE MARKET

Standard Smoked Sheets—Sellers—Nov. 8			
November	—	@	6 1/32d
Jan.-Mar.	—	@	6 1/32d

Reclaimed Rubber

Considering general business conditions, reclaimers are fairly optimistic and look forward to greatly increased activities within the next few months. Production schedules are fair with some slight buying interest being shown. Reclaimed rubber is such a vital part of the rubber industry that a considerable volume of business is done, especially on a rising crude market. Promising aspects for the automobile industry in 1935 are bound to be reflected in greater tire production schedules and a larger consumption of reclaims. Quotations remain unchanged at the following levels:

High Tensile			
Super-reclaim, black	.08¾	@	.09
High Tensile Red	.07	@	.07¼
Shoe			
Unwashed	.06½	@	.06¾
Washed	.08	@	.09
Tube			
No. 1 (Floating)	.13	@	—
No. 2 (Compounded)	.07½	@	.07¾
Tires			
Black	.05	@	.05¼
Black, selected tires	.05¼	@	.05½
Dark Gray	.06¼	@	.06½
White	.09¼	@	.09½
Truck, Heavy Gravity	.05½	@	.06
Truck, Light Gravity	.06	@	.06¼
Miscellaneous			
Mechanical blends	.04¼	@	.04⅝

Scrap Rubber

Prices on scrap remain unchanged since our last report. Dealers state that there is little buying interest at the present time with reclaimers apparently being plentifully supplied with stocks. The industry looks hopefully to better conditions next year. Quotations follow:

(Prices to Consumers)

Auto tire peelings	ton	18.00	@20.00
Mixed auto	ton	9.00	@10.00
Clean solid truck tires	ton	35.00	@37.50
Boots and shoes	ton	20.00	@21.50
Arctics, untrimmed	ton	16.00	@17.50
Inner tubes, No. 1	lb.	.06¾	@ .07
Inner tubes, No. 2	lb.	.03½	@ .03⅝
Inner tubes, Red	lb.	.02⅜	@ .02½

Cotton

Cotton prices moved in a 40 point range during the past month. Today's price of 12.40 is exactly the same as that reported for October 8. The cotton trade seems to be marking time awaiting the answer to the question of what the cotton acreage to be fixed by the Agricultural Adjustment Administration for 1935 will be. It is hoped that that body will relax its restriction program next year to give this country's cotton a better competitive position abroad and to prevent the permanent loss of a part of the foreign market. On the other hand it has been pointed out that easing restriction may endanger the large sums of money that the government has paid out on the 12-cent loan. Due to the uncertainty surrounding the acreage figure awaited, the market is increasingly nervous with little fluctuation. Quotations for middling uplands on the N. Y. Cotton Exchange follow:

	Oct. 8	November 8		
	Close	High	Low	Close
December	12.14	12.24	12.15	12.16
March	12.25	12.35	12.27	12.29
May	....	12.36	12.26	12.27

Tire Fabrics

(Prices Net at the Mill—Process Tax Included)

Peeler, carded, 23/5/3	lb.	.39	@ —
Peeler, carded, 23/4/3	lb.	.40	@ —
Peeler, carded, 15/3/3	lb.	.37	@ —
Peeler, carded, 13/3/3	lb.	.36	@ —
Egyptian, carded, 23/5/3	lb.	.49¼	@ —
Egyptian, combed, 23/5/3	lb.	.54¾	@ —
CHAFERS			
Carded, American, 1 1/32"	lb.	.38	@ .40
Carded, American, 1"	lb.	.31½	@ .34½
LENO BREAKER			
Carded, American, 1 1/32"	lb.	.38	@ .40
Carded, American, 1"	lb.	.31½	@ .34½

Sheetings

Count	Width	Weight			
48x40	36 in.	5.50	lb.	.05⅜	@ .05½
40x40	36 in.	6.15	lb.	—	@ .04⅞
40x36	36 in.	6.50	lb.	—	@ .04½
48x48	40 in.	2.50	lb.	—	@ .11½
48x48	40 in.	2.85	lb.	.10¼	@ .10½
64x68	40 in.	3.15	lb.	—	@ .10½
56x60	40 in.	3.60	lb.	.08¾	@ —
48x44	40 in.	3.75	lb.	—	@ .08½
44x40	40 in.	4.25	lb.	—	@ .07⅝

Ducks

Enameling	lb.	.32	@	.37½
Belting and Hose	lb.	.34	@	—
Single filling, A grade	lb.	.16¾	@	.17¼
Double filling	lb.	.17¾	@	.18¼

Closing Rubber Prices on New York Commodity Exchange, Inc.

No. 1 Standard Contract of 10 tons

FROM OCTOBER 9 TO NOVEMBER 8

Date	Spot	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Sales
Oct. 9	13.50	13.46	13.58	13.69	13.80	13.93	14.07	14.18	14.28	14.40	14.52	14.64	14.76	——	452
10	13.82	13.74	13.85	13.96	14.09	14.22	14.36	14.47	14.58	14.69	14.80	14.92	15.04	——	361
11	14.43	14.33	14.44	14.58	14.70	14.84	14.98	15.10	15.20	15.32	15.42	15.54	15.66	——	781
12	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
13	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
14	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
15	13.87	13.80	13.92	14.05	14.18	14.31	14.44	14.53	14.68	14.74	14.89	15.00	15.09	——	326
16	14.12	14.05	14.15	14.27	14.40	14.53	14.65	14.77	14.89	14.99	15.10	15.20	15.30	——	303
17	14.06	13.98	14.08	14.15	14.26	14.39	14.53	14.64	14.74	14.85	14.95	15.08	15.21	——	247
18	14.00	14.02	14.10	14.20	14.32	14.45	14.58	14.69	14.79	14.90	15.00	15.12	15.21	——	132
19	14.00	13.92	14.01	14.11	14.22	14.36	14.51	14.61	14.71	14.80	14.90	15.00	15.10	——	109
20	13.87	13.81	13.91	14.01	14.13	14.27	14.41	14.52	14.62	14.72	14.82	14.92	15.02	——	74
21	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
22	13.95	13.89	13.98	14.07	14.15	14.30	14.45	14.56	14.66	14.76	14.86	14.96	15.06	——	111
23	14.05	14.01	14.09	14.17	14.29	14.42	14.53	14.65	14.78	14.89	14.99	15.09	15.19	——	166
24	14.05	13.97	14.05	14.13	14.25	14.38	14.52	14.62	14.72	14.83	14.93	15.03	15.13	——	89
25	13.96	13.91	13.98	14.06	14.16	14.29	14.45	14.54	14.64	14.76	14.87	14.98	15.08	——	318
26	13.87	13.76	13.83	13.91	14.01	14.13	14.26	14.37	14.47	14.57	14.67	14.78	14.88	——	391
27	13.87	13.78	13.85	13.93	14.06	14.18	14.31	14.42	14.52	14.62	14.72	14.82	14.93	——	29
28	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
29	13.90	13.84	13.91	13.99	14.12	14.24	14.37	14.46	14.56	14.66	14.76	14.86	14.97	——	114
30	13.75	13.66	13.73	13.81	13.92	14.03	14.15	14.25	14.35	14.45	14.55	14.66	14.76	——	275
31	12.88	——	12.82	12.90	13.02	13.14	13.26	13.36	13.44	13.52	13.62	13.72	13.83	——	1229
Nov. 1	13.12	——	13.04	13.14	13.23	13.35	13.48	13.58	13.68	13.78	13.88	13.98	14.12	14.22	452
2	13.60	——	13.54	13.61	13.72	13.82	13.92	14.03	14.14	14.25	14.37	14.47	14.57	14.67	689
3	12.95	——	12.90	12.97	13.08	13.20	13.33	13.45	13.57	13.66	13.75	13.87	14.00	14.10	267
4	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
5	12.96	——	12.94	13.01	13.12	13.22	13.32	13.43	13.53	13.63	13.77	13.88	13.98	14.08	493
6	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
7	13.38	——	13.31	13.38	13.50	13.61	13.72	13.83	13.93	14.04	14.16	14.27	14.39	14.49	334
8	13.25	——	13.21	13.28	13.40	13.51	13.61	13.72	13.83	13.93	14.03	14.14	14.25	14.35	273

Rubber CHEMICAL Markets

NEW YORK, NOVEMBER 9, 1934

[All Quotations F.O.B. Works Unless Otherwise Noted]

ACCELERATORS

Organic			
A-1 (Thiocarbanilid)	lb.	.21 @	.25
A-5-10	lb.	.33 @	.36
A-7	lb.	.53 @	.65
A-11	lb.	.60 @	.75
A-16	lb.	.55 @	.65
A-19	lb.	.56 @	.75
A-32	lb.	.70 @	.80
A-17	lb.	— @	—
Aldehyde ammonia, crystals	lb.	.65 @	.67
Altax	lb.	— @	—
Captax	lb.		
Crylene	lb.	.55 @	.65
paste	lb.	.45 @	.55
Di-Ortho-Tolyguanidine	lb.	.46 @	.47
Diphenylguanidine	lb.	.36 @	.37
Ethylidene aniline	lb.	.45 @	.47½
Formaldenyde aniline	lb.	.37½ @	.42
Guantal	lb.	.42 @	.51
Heptene	lb.	.40 @	—
Hexamethylene-tetramine	lb.	.37 @	—
Lead Oleate, No. 999	lb.	.11 @	—
Witco	lb.	.11 @	—
Lithex	lb.	.18 @	.20
Methylenedianiline	lb.	.36 @	.37
Monex	lb.	3.25 @	—
Oxynone	lb.	.68 @	.80
Phenex	lb.	.50 @	.55
Pipsolene	lb.	3.55 @	4.00
R & H 40	lb.	.40 @	.41
R & H 50	lb.	.40 @	.41
R-2	lb.	1.55 @	1.90
Safex	lb.	1.20 @	1.25
SPDX	lb.	.75 @	—
Super-Sulphur No. 1	lb.		
No. 2	lb.		
Thiocarbanilid, drums	lb.	.21 @	.25
Trimene	lb.	.75 @	—
base	lb.	1.20 @	—
Triphenylguanidine	lb.	.58 @	.60
Tuads	lb.		
Ureka	lb.	.62 @	1.00
Ureka B	lb.	— @	—
Ureka C	lb.	.58 @	.69
Vulcanex	lb.		
Vulcone	lb.		
Vulcanol	lb.		
Z-88-P	lb.	.48 @	.60
Zimate	lb.		
Inorganic			
Litharge, domestic	lb	.06¼ @	.06½
Magnesia, calcined, heavy	ton	60.00 @	65.00

COLORS

Blacks (See Compounding Materials)

Blues			
Prussian	lb.	.36 @	.38
Ultramarine	lb.	.12 @	.15
Browns			
Sienna, Italian	lb.	.06 @	'13
Umber, Turkey	lb	.04 @	.04½
Greens			
Chrome, light	lb.	.20 @	.30
medium	lb.	.21 @	.31
dark	lb.	.24 @	.30
Chromium Oxide, bbl.	lb.	.22 @	.23
Reds			
Antimony			
crimson, 15/7	lb.	.46 @	—
sulfur, free	lb.	.48 @	.52
Indian English	lb.	.09 @	.10
Domestic (Maroon)	lb.	.11 @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red, f.o.b. Easton	lb.	.09¼ @	—
Whites			
Cryptone CB, No. 21	lb.	.06 @	.06¼
Cryptone, No. 19	lb.	.06 @	.06¼
Lithopone			
Albalith, black label—11	lb.	.04½ @	.04¾
Azolith	lb.	.04½ @	.04¾
Rayox	lb.		
Titanium oxide	lb.	.17 @	.19
Titanox B	lb.	.06 @	.06½
Titanox C	lb.	.06 @	.06½
XX—20 Zinc Sulphide, bbls.	lb.	.11 @	.11¼
XX—86 Zinc Sulphide, bbls.	lb.	.11 @	.11¼
Zinc Oxide—American Process			
American Azo:			
ZZZ (lead free)	lb.	.06½ @	.06¾
ZZ (leaded)	lb.	.06¼ @	.06½
Horsehead Lead Free Brand:			
Special—3	lb.	.06½ @	.06¾
XX Red—4	lb.	.06½ @	.06¾
XX Red—72	lb.	.06½ @	.06¾
XX Red—78	lb.	.06½ @	.06¾
XX Red—103	lb.	.06½ @	.06¾
U. S. P.—X, bbls.	lb.	.12½ @	.12¾
Kadox, black label—15	lb.	.09⅜ @	.09⅝
Blue label—16	lb.	.08⅜ @	.08⅝
Red label—17	lb.	.07 @	.07¼
St. Joe, black label	lb.	.06½ @	.06¾
green label	lb.	.06½ @	.06¾
red label	lb.	.06½ @	.06¾
Zinc Oxide—French Process			
Anaconda, lead free	lb.	.06½ @	.06¾
Anaconda, selected lead free	lb.	.06¾ @	.07
Florence White seal—7 bbls.	lb.	— @	.10⅜
Green seal—8	lb.	.09⅜ @	.09⅝
Red seal—9	lb.	.08⅜ @	.08⅝
Yellows			
Chrome	lb.	.15 @	.16
Ocher, dom. med.	lb.	.01½ @	.02

BLACKS

Arrow "Aerfloted" Specification	lb.	.0535 @	.0825
Bone, powdered	lb.	.05½ @	.12½
Carbon, compressed	lb.	.0535 @	.0825
uncompressed	lb.	.0535 @	.0825
"Certified," Cabot	lb.	.0535 @	.0825
Spherons	lb.	.0535 @	.0825
"Disperso"	lb.	.0535 @	.0825
Drop, bbls.	lb.	.05½ @	.14
"Excello," compressed	lb.	.0535 @	.0825
"Fumonex"	lb.	.03 @	.07
"Gastex"	lb.	.03 @	.07
Lampblack	lb.	.06 @	.08
"Micronex"	lb.	.0535 @	.0825
"Supreme"	lb.	.0535 @	.0825
Thermatomic—"P 33"	lb.	— @	—
"Thermax"	lb.	— @	—
United "Dixie" & "Kosmos"	lb.	.0535 @	.0825

COMPOUNDING MATERIALS

Aluminum Flake	ton.	21.85 @	24.50
Ammonia carbonate, lump	lb.	.10½ @	.12
Asbestine	ton	14.00 @	15.00
Barium carbonate (98-100%)	ton	56.50 @	61.50
Barium Dust	lb.	.05 @	.06
Barytes southern off-color	ton	10.00 @	18.00
Western prime white	ton	23.00 @	30.00
Basofor	lb.	.04½ @	—
Bentonite	lb.	.02 @	.03
Blanc fixe dry f.o.b. works	ton	42.50 @	70.00
Calcene	ton	35.00 @	45.00
Catalpo (fact.)	lb.	.02 @	—
Chalk, precipitated			
Suprex white, extra lt.	ton	60.00 @	75.00
heavy	ton	45.00 @	55.00
Clay, Kaolin, domestic	ton	7.50 @	15.00
Aerfloted, Suprex	ton	7.50 @	10.00
Congaree	ton	9.00 @	—
Dark Blue Ridge	ton		
Dixie	ton		
Lexington	ton	10.00 @	22.00
McNamee	ton		
Par	ton		
Tensulite		15.00 @	—
Cotton Flock	lb.	.10½ @	.18
Glues, extra white	lb.	.28 @	.30
medium white	lb.	.14 @	.19
Kalite No. 1	ton	30.00 @	55.00
Kalite No. 3	ton	40.00 @	65.00
Magnesium carbonate	lb.	.06½ @	.06¾
Mica	ton	65.00 @	80.00
Rottenstone (powdered)	lb.	.02½ @	.05
Soapstone, powdered	ton	16.00 @	22.00
Starch, powdered	cwt.	3.56 @	3.76
Talc, domestic	ton	12.00 @	15.00
Pyrax A	ton		
Whiting, commercial	ton	17.00 @	18.00
English Cliffstone	ton	33.00 @	43.00
Sussex	ton		
Witco	ton	20.00 @	50.00
Wood Flour	ton	18.00 @	30.00
Zinc Carbonate	lb.	.09½ @	.11
Zinc Stearate	lb.	.25 @	—

MINERAL RUBBER

Genasco, solid (factory)	ton	25.00 @	27.00
Hard Hydrocarbon	ton		
Parmr, solid	ton	21.00 @	26.00
Pioneer, MR, solid	ton		
Pioneer-granulated	ton		

WETTING AGENTS

Arkesklene	lb.	— @	—

SPECIALTIES

Aromatics—Rodo	lb.		
Para-Dors No. 5145	lb.	2.00 @	—
Sunproof	lb.	.35 @	.37½
Sponge Paste	lb.	— @	.80
Tonox	lb.	.56 @	.60

SOFTENERS

Acids			
Nitric, 36 degrees	cwt.	5.00 @	5.25
Sulfuric, 66 degrees	cwt.	1.60 @	1.90
Tartaric, crystals	lb	.26 @	—
Acids, Fatty			
Laurex	lb.	.15 @	.16
Stearex	lb.	.08 @	.12
Stearic, double pressed	lb.	.08 @	.12
Alkalies			
Caustic Soda, 76%	cwt.	3.60 @	3.75
Soda Ash, 58% C.L.	cwt.	2.52 @	-
Oils			
Corn, refined, bbls.	lb.	.08½ @	.08⅝
Cottonseed, crude	gal.	— @	.04
Cycline Oil	gal.	.15 @	.28
Degras (c.l. 100 bbls.)	lb.	.02¾ @	—
Less c.l. (10-25 bbls.)	lb.	.03 @	—
Lots less than 10 bbls.	lb.	.03¼ @	—
Fluxrite	lb.	.05½ @	.06½
Palm Lagos	lb.	.03½ @	.03¾
Niger	lb.	.03¼ @	.03½
Para-Flux	gal.	.17 @	—
Petrolatum, light	lb.	.02 @	.02½
Pigmentaroil, tank cars	gal.	.14 @	—
in drums	gal.	.20 @	.21½
Pine, steam distilled	gal.	.64 @	.65
dest. dist., drums	gal.	.59 @	.62
Seedine, c.l.	lb.	.07¼ @	—
Tackol	lb.	.08½ @	.18
Witco Palm Oil	lb.	.07½ @	—
Witco Softener (f.o.b. wks.)	lb.	.02 @	—
Woburn No. 8, c.l.	lb.	.06 @	—
Wobonite, c.l.	lb.	.05 @	—
Resins and Pitches			
Pitch, Burgundy	lb.	.05 @	.06
coal tar	gal.	.05½ @	.06
hardwood	ton	20.00 @	25.00
pine, 200 lb. gr. wt.	bbl.	6.00 @	—
Rosin, grade K, 280 lb.	bbl.	5.55 @	—
Pigmentar, tank cars	gal.	.14 @	—
in drums	gal.	.20 @	.21½
R. S. L. Resin	lb.	— @	—
Tar Retort, drums	bbl.	12.50 @	—
Solvents			
Acetone, pure	lb.	.12½ @	.13½
Alcohol, denatured, methanol, No. 1 bbls.	gal.	.30½ @	.35½
Benzene, 90%	gal.	— @	.19
Bondogen	lb.	— @	—
Carbon, bisulfide	lb.	.05½ @	.06
Carbon, tetrachloride	lb.	.05¾ @	.08½
Dichlorethylene	lb.	.29 @	—
Dipentene	gal.	.31 @	.41
Dryolene (f.o.b. Okla.)	gal.	.10 @	.10½
Ethylene dichloride	lb.	.05½ @	.06½
Gasoline, steel bbls.	gal.	.16 @	—
Naphtha, solvent	gal.	.26 @	.31
Plastogen	lb.		
Rub-Sol (f.o.b. Okla.)	gal.	.09 @	—
Turpentine, spirits	gal.	.46½ @	.50½
wood	gal.	.41 @	—
dest. dist., drums	gal.	.40 @	.44
Waxes			
Beeswax, white	lb.	.34 @	.37
Carnauba, yellow	lb.	.34½ @	.37
Ceresin, white	lb.	.10 @	.11
Montan, crude	lb.	.10 @	.11
Ozokerite, black	lb.	.24 @	.25
green	lb.	.26 @	.30
Paraffin (c.l.—f.o.b. N. Y.)			
Yellow crude scale	lb.	.03 @	—
White crude scale 124/126	lb.	.03 @	—
Refined, 125/127	lb.	.04¼ @	—

ANTI-OXIDANTS

AgeRite, Gel	lb.		
Powder	lb.		
Resin	lb.		
White	lb.		
Albasan	lb.	.70 @	.75
Antox	lb.		
B-L-E	lb.	.57 @	.60
Flectol-H	lb.	— @	—
Flectol White	lb.	— @	—
Flectol B	lb.	— @	—
Neozone	lb.		
Oxynone	lb.	.66 @	.90
Retardex	lb.	.35 @	.40
Stabilite	lb.	.57 @	.62
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.55 @	.60

MOLD LUBRICANTS

Cocoa Soapstock	lb.	.06 @	.08
Dipex	lb.	.06 @	.08
Rusco, f.o.b. Nitro	lb.	.12 @	.30
Sericite, f.o.b. N. Y.	ton	65.00 @	—
Soap Tree Bark, cut, sifted	lb.	.06 @	.08
Zip (Mold Wash)	lb.	— @	—

SUBSTITUTES (FACTICE)

Amberex	lb.	.13¼ @	—
Black	lb.	.08½ @	—
White	lb.	.08 @	.12
Brown	lb.	.07 @	.11½

VULCANIZING INGREDIENTS

Sulfur Chloride, yellow (drs.)	lb.	.03½ @	.04½
Sulfur flour,			
Refined, 100% pure (bags)	cwt.	3.45 @	—
Commercial (bags)	cwt.	1.95 @	2.80
Telloy	lb.		
Vandex	lb.		

Crude Rubber
Latex and Guayule
Reclaimed Rubber
Tires and Tubes

STATISTICS OF THE INDUSTRY

Rim Production
Automobiles
Gasoline
Cotton Prices

U. S. Imports and Exports of Crude Rubber

YEARS	Gross Imports: Long Tons	Total Declared Value	Average Declared Value per pound Cents	Re-exports: Long Tons	Total Declared Value	Average Declared Value per pound Cents	Net Imports: Long Tons
1922	301,076	101,843,188	15.10	4,809	1,921,828	17.84	296,267
1923	309,144	185,060,304	26.72	8,772	5,672,319	28.87	300,372
1924	328,056	174,231,331	23.71	10,309	6,057,637	26.23	317,747
1925	396,642	429,705,014	48.36	14,827	19,847,753	59.76	381,815
1926	413,338	505,817,807	54.63	17,671	22,470,583	56.77	395,667
1927	426,258	339,874,774	35.60	27,775	24,735,488	39.76	398,483
1928	439,731	244,854,973	25.03	32,159	18,128,361	25.17	407,572
1929	560,084	239,178,783	19.15	36,485	16,868,733	20.64	523,599
1930	482,082	139,134,330	12.89	30,205	9,316,205	13.77	451,877
1931	497,138	72,918,949	6.54	25,595	4,255,472	7.42	471,543
1932	409,584	31,936,459	3.47	20,929	2,015,612	4.30	388,655
1933	407,817	44,034,064	4.82	20,537	2,601,352	5.65	427,280
1932:							
Sept.	28,956	1,774,403	2.73	2,388	241,960	4.54	26,568
Oct.	35,096	2,436,522	3.10	1,059	98,022	4.13	34,037
Nov.	28,908	2,263,469	3.48	1,745	158,618	4.06	27,163
Dec.	31,384	2,360,061	3.34	770	66,165	3.98	30,614
1933:							
Jan.	29,822	2,213,828	3.03	1,403	109,916	3.49	28,419
Feb.	22,603	1,554,086	3.12	1,244	102,129	3.73	21,359
Mar.	27,936	1,867,657	2.98	1,127	86,21o	3.42	26,809
April	20,240	1,291,136	2.85	798	70,111	3.92	19,442
May	26,002	1,694,963	2.93	1,842	189,451	4.59	24,894
June	22,900	1,780,495	3.47	1,276	156,168	5.46	21,624
July	44,625	4,293,111	4.29	1,419	219,945	6.92	43,206
August	44,257	5,391,709	5.44	2,205	302,132	6.12	42,052
Sept.	44,912	6,110,956	6.07	2,369	335,798	8.89	42,543
Oct.	44,474	6,115,330	6.14	2,669	397,167	6.64	41,805
Nov.	40,582	5,850,714	6.44	2,188	333,631	6.81	38,394
Dec.	39,461	5,869,556	6.75	1,888	293,690	6.94	37,573
1934:							
Jan.	47,963	7,403,123	6.89	1,975	352,116	7.96	45,988
Feb.	34,335	5,262,711	6.84	2,133	476,232	9.97	32,202
Mar.	41,119	6,765,173	7.34	2,947	583,313	8.83	38,172
April	43,841	8,232,746	8.37	2,814	588,453	9.18	41,027
May	48,494	10,001,239	9.21	2,389	544,212	10.17	46,105
June*	47,289	10,747,464	10.14	2,012	501,499	11.33	45,277
July	41,443	9,670,617	10.41	2,366	660,199	13.99	39,077
August	31,531	7,873,690	11.15	1,393	400,433	12.83	30,138
Sept.	31,074	8,293,859	11.92	1,665	474,446	12.72	29,409

* Revised.

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All Quantities in Long Tons)

	Guayule: Tons	Guayule: Dollars	Balata: Tons	Balata: Dollars	Jelutong: Tons	Jelutong: Dollars	Liquid Latex (1): Tons	Liquid Latex (1): Dollars
1924	1,356	536,392	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,853	3,537,810
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	3,388	4,680,386
1927	5,018	2,674,957	582	447,246	7,785	2,448,657	1,116	876,077
1928	3,075	1,755,685	731	430,855	7,552	2,540,059	4,167	2,185,579
1929	1,231	545,175	728	566,964	8,203	2,458,136	3,728	1,787,997
1930	1,096	347,388	501	422,684	5,907	1,403,244	4,449	1,506,804
1931	—	—	1,208	411,692	5,777	1,019,010	4,650	884,355
1932	—	—	708	147,403	4,607	616,596	5,085	601,999
1933	—	—	1,658	2,261,869	5,989	944,895	11,085	1,833,671
1933:								
Aug.	—	—	272	527,147	390	55,509	1,156	196,138
Sept.	—	—	65	30,738	761	149,296	1,343	267,516
Oct.	—	—	119	47,663	542	99,249	1,561	310,531
Nov.	—	—	31	11,252	626	125,160	1,239	282,065
Dec.	—	—	42	20,008	708	143,868	1,290	270,533
1934:								
Jan.	—	—	98	43,932	766	169,966	1,126	239,054
Feb.	—	—	68	36,346	453	102,471	885	193,732
Mar.	51	9,464	145	51,080	25.	43,532	1,134	257,545
April	100	18,928	128	50,965	533	98,658	1,334	321,390
May	100	18,928	143	65,471	538	95,710	1,407	368,642
June	—	—	84	49,881	388	71,672	1,458	421,317
July	—	—	160	63,963	482	87,412	1,231	385,733
August	100	18,607	100	36,732	516	85,651	1,169	369,335
Sept.	—	—	48	14,415	259	47,542	936	312,967

(1) Weight given in pounds of dry rubber contained in latex.

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)

Figures on Monthly Basis

	1927	1928	1929	1930	1931	1932	1933	1934
Jan.	31,518	34,403	43,002	36,194	28,557	29,648	21,661	40,413
Feb.	30,137	33,702	41,594	33,302	28,797	31,821	21,638	40,609
Mar.	36,141	35,688	44,730	35,540	32,788	29,505	18,047	47,097
Apr.	35,871	32,772	47,521	39,686	33,321	27,515	25,928	44,947
May	34,592	37,333	49,233	39,386	37,817	30,957	44,074	43,012
June	33,801	37,676	43,227	34,195	37,916	41,475	50,743*	40,241
July	29,219	37,407	41,526	29,508	31,397	29,976	49,614*	32,647
Aug.	33,460	42,927	38,274	30,850	27,586	23,721	44,428*	33,310
Sept.	27,214	39,882	34,707	25,515	23,638	23,847	35,281*	30,352
Oct.	26,790	40,857	34,800	27,516	22,277	22,286	31,906	.....
Nov.	26,792	37,461	27,659	23,691	22,943	23,231	29,162	.....
Dec.	25,492	31,232	25,531	21,687	21,409	18,015	29,087	.....
Tot.	371,027	441,340	469,804	375,980	348,986	332,000	402,485*	.....

* Revised.

Figures on Quarterly Basis

Quarter	1926	1927	1928	1929	1930	1931	1932	1933
Jan./Mar.	94,301	99,216	103,558	128,565	101,610	89,652	85,309	64,326
Apr./June	87,109	103,242	103,500	139,292	112,229	107,755	92,643	125,126
July/Sept.	93,793	89,210	117,573	113,746	85,261	83,632	72,523	132,406
Oct./Dec.	83,212	80,860	117,597	84,872	72,020	65,645	64,145	94,198
Totals	358,415	372,528	442,227	466,475	371,120	346,684	314,620	416,056

Note—The quarterly figures are generally regarded as the most authentic; the monthly figures may be accepted as preliminary.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption: Tons	Consumption: % to Crude	Stocks*	Year	Production	Consumption: Tons	Consumption: % to Crude	Stocks*
1924	80,079	76,072	22.4	.....	1929	218,954	226,588	48.4	27,464
1925	132,930	137,105	35.6	13,203	1930	157,967	153,497	40.8	22,000
1926	180,582	164,500	45.9	23,213	1931	133,351	124,126	33.9	19,257
1927	189,144	178,471	47.6	24,980	1932	75,608	77,504	23.4	16,354
1928	208,516	223,000	50.4	24,785	1933	99,560	81,602	19.9	20,746
1933:									
Jan.	5,30i	4,811	21.0	16,262	July	12,049	10,317	20.8	* 14,108
Feb.	4,578	4,363	20.2	16,570	Aug.	11,708	9,446	21.2	* 15,037
Mar.	3,847	3,454	19.1	15,496	Sept.	10,435	7,862	22.3	* 15,869
Apr.	4,617	4,407	13.1	14,370	Oct.	9,466	7,212	22.6	17,748
May	8,366	7,770	17.4	13,734	Nov.	9,063	6,335	21.7	19,170
June	10,591	9,674	19.1	13,231	Dec.	9,539	5,951	20.5	20,746
1934:									
Jan.	9,828	7,000	17.3	24,263	July	9,446	8,175	25.0	24,926
Feb.	9,504	7,646	18.8	23,356	Aug.	8,160	8,493	25.5	24,607
Mar.	11,479	9,683	20.6	25,113	Sept.	6,974	7,028	23.2	24,540
Apr.	10,185	9,387	20.9	22,033	Oct.	....	....	...	....
May	10,848	9,500	22.1	22,887	Nov.	....	....	...	....
June	10,820	9,459	23.5	23,664	Dec.	....	....	...	....

* Stocks on hand at the end of month or year.
* Revised.
(Rubber Manufacturers' Association figures raised to 100%)

U. S. Consumption of Gasoline

(In Thousands of Barrels of 42 Gallons)

	1932	1933*	1934		1932	1933*	1934
January	26,038	26,397	29,416	August	35,706	37,400	38,933
February	25,378	23,320	25,048	September	33,828	34,580	34,984
March	29,597	28,123	30,528	October	32,680	33,022	.....
April	31,234	29,791	32,735	November	29,895	30,312	.....
May	32,016	33,709	38,141	December	27,110	28,572	.....
June	39,489	37,699	36,296				
July	30,929	34,087	37,393	Total	373,900	377,003*	.....

* Revised on basis of final 1933 figures issued September 26, 1934 by Bureau of Mines.

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
1932																																
June	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2⅞	2¾	2¾	2¾	2⅞	2¾	2¾	—	2¾	2½	2½	2½	—	2¾
July	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2¾	2⅞	2¾	2¾	2¾	2⅞	2¾	2¾	3⅛	2¾	3½	3½	3½	—	2¾
August	3¼	3½	3¼	3¾	3¾	3¾	3½	3½	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	4	3¾	3¾	3⅞	3¾	3⅞	4	4	4½	4½	4½	4½	3¾
September	4¼	4¼	4¼	4¾	4¾	4¾	4½	4½	4¾	4¾	4¾	4¾	4¾	4¾	4¾	4¾	4¾	4¾	4⅞	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛
October	3¼	3½	3½	3¾	3¾	3¾	3½	3½	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾	3¾
November	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛
December	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼
1933																																
January	—	2⅛	2⅛	3⅛	3⅛	3¼	2⅛	—	3⅛	3⅛	3¼	3⅛	3⅛	3⅛	—	3	3⅛	2⅛	—	3⅛	3	—	—	3⅛	3⅛	2⅛	2⅛	2⅛	—	2⅛	3
February	2⅛	3	2⅛	3	—	3	2⅛	2⅛	3	3	3	—	2⅛	—	2⅛	3⅛	2⅛	3⅛	3⅛	3⅛	3⅛	3	3⅛	2⅛	3⅛	3⅛	2⅛	2⅛	2⅛	2⅛	2⅛	3
March	3⅛	4⅞	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛
April	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛
May	4⅝	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛
June	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛
July	6½	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛
August	7⅛	7⅛	8	7⅛	7⅛	7	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛
September	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛
October	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛
November	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛
December	9¼	9¼	9¼	9¼	9¼	8¼	9⅛	8¼	8¼	8½	8¼	8¼	8¼	8¼	8¼	8¼	8¼	8¼	8¼	8¼	8¼	8¼	8¼	8¼	8¼	8¼	8¼	8¼	8¼	8¼	8¼	8¼
1934																																
January	—	9	8⅛	9	9	9	—	8¾	8¾	8¾	8¾	8¾	8¾	—	9⅛	9	8¾	9⅛	9⅞	9¾	—	9½	9¾	9⅛	—	10⅜	—	10	—	9⅜
February	9⅜	10½	10½	10⅞	10¾	10¾	10⅜	10¾	10¾	10⅛	—	—	10¾	10⅞	11⅜	10¾	10¼	11⅜	11⅞	10¾	10½	10⅞	10⅛	10⅜	11⅛	10⅜	10⅜	10⅜	11⅛	10⅛	10½
March	10⅞	11⅜	11⅜	11⅝	11⅜	11⅜	11⅞	11⅞	11⅞	11⅜	11⅜	11⅜	12	12⅛	11⅜	11⅜	11⅜	12⅛	12⅜	12⅜	12⅛	12⅛	12⅜	12⅜	12⅜	12⅝	12⅝	12⅛	—	—	11
April	14¾	14⅝	14⅞	15	15⅛	15⅛	15¼	13¾	14	13¾	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	14⅛	13⅞	13⅞	13½	13⅝	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	12⅝
May	13	13	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜
June	14	14⅜	15	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜
July	14⅜	14⅜	15	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜
August	14⅜	15	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜
September	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜
October	14½	13⅞	13⅞	14	13⅝	13⅞	14	13⅝	13¾	13⅞	14⅜	15⅛	—	—	13⅞	14⅛	14	14⅛	15	14	15⅛	15⅛	15⅛	14⅛	13⅞	15⅛	15	14⅛	—	13¾	13	14—
November	13⅝	13⅝	13	—	13	—	13⅜	—	13¾	—	—	—	—	—	—	—	—	14⅛	14⅞	—	15⅛	15⅛	15⅛	14⅛	13⅞	15⅛	15⅛	14⅛	14⅛	13¾	13	14—

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1910-1929

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1910	206.60	1914	65.33	1918	60.15	1922	17.50	1926	48.50
1911	141.30	1915	65.85	1919	48.70	1923	29.45	1927	37.72
1912	121.60	1916	72.50	1920	36.30	1924	26.20	1928	22.48
1913	82.04	1917	72.23	1921	16.36	1925	72.46	1929	20.55

Average Monthly Price per Pound Since 1928

Month	1928 Cents	1929 Cents	1930 Cents	1931 Cents	1932 Cents	1933 Cents	1934 Cents
Jan.	40.25	20.14	15.24	8.34	4.38	3.08	9.32
Feb.	32.75	23.97	15.85	7.70	4.03	2.95	10.45
Mar.	26.82	24.55	15.34	7.71	3.35	3.01	11.01
Apr.	18.97	21.18	14.93	6.43	3.02	3.56	12.10
May	18.99	21.46	14.24	6.49	3.09	4.95	13.26
June	19.59	20.64	12.45	6.35	2.66	6.15	13.51
July	19.40	21.30	11.24	6.37	2.89	8.01	14.60
Aug.	19.46	20.59	9.96	5.38	3.63	7.31	15.47
Sept.	18.47	20.37	8.28	5.08	3.84	7.30	15.36
Oct.	18.83	19.67	8.20	4.87	3.65	7.64	13.96
Nov.	18.26	16.62	9.01	4.65	3.44	8.66	....
Dec.	17.97	16.12	9.05	4.64	3.24	8.87	....
Average for Year	22.48	20.55	11.98	6.17	3.49	5.96	....

London Closing Prices of Ribbed Smoked Sheets

(In Pence Per Pound)

Day	Aug.	Sept.	Oct.	Nov.	Day	Aug.	Sept.	Oct.	Nov.
1	7 1/16	—	7 1/16	6 3/4	17	7 1/16	7 3/16	6 7/8	
2	7 1/16	—	7 1/16	6 13/16	18	—	7 3/16	6 7/8	
3	7 1/16	7 1/16	6 11/16	6 3/8	19	—	7 3/16	6 11/16	
4	—	7 1/16	7	—	20	7 1/16	7 1/16	6 11/16	
5	—	7 1/16	6 3/4	6 1/16	21	7 1/2	7 3/16	—	
6	—	7 3/16	6 11/16	6 3/16	22	7 1/16	7 3/16	6 11/16	
7	7 1/16	7 1/16	—	6 3/16	23	7 1/16	—	6 7/8	
8	7 3/16	—	6 7/8	6 1/16	24	7 1/2	7 1/16	6 11/16	
9	7 3/16	—	6 11/16	—	25	—	7 3/16	6 3/4	
10	7 1/16	7 1/16	6 3/4	—	26	—	7 3/16	6 3/4	
11	—	7 1/16	6 11/16	—	27	7 1/16	7 3/16	6 11/16	
12	—	7 1/2	6 11/16	—	28	7 1/2	7 1/16	—	
13	7 1/16	7 3/16	6 11/16	—	29	7 1/2	7 1/16	6 1/16	
14	7 3/16	7 3/16	—	—	30	7 3/16	—	6 5/16	
15	7 3/16	—	6 7/16	—	31	7 1/16	—	6 3/16	
16	7 1/16	—	6 7/8	—					

Average Monthly Price Per Pound

Month	1931 Pence	1932 Pence	1933 Pence	1934 Pence	Month	1931 Pence	1932 Pence	1933 Pence	1934 Pence
Jan.	4.160	3.052	2.264	4.429	Aug. ...	3.385	2.654	3.811	7.401
Feb. ...	3.823	2.760	2.093	4.920	Sept. ..	2.524	2.485	3.728	7.409
Mar. ...	3.822	2.047	2.099	5.136	Oct. ...	2.898	2.425	3.957	6.806
Apr. ...	3.082	1.876	2.323	5.712	Nov. ..	2.890	2.518	4.096	
May ...	3.035	1.825	2.966	6.207	Dec. ..	3.115	2.444	4.200	
June ...	3.082	1.750	3.392	6.245	Average for				
July ...	3.048	1.875	3.860	7.053	Year ...	3.155	2.434	3.233	

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Date	Sept.	Oct.	Nov.	Date	Sept.	Oct.	Nov.	Date	Sept.	Oct.	Nov.
1	—	12.50	12.25	11	13.30	12.65		21	13.00	—	
2	—	12.50	12.30	12	13.15	—		22	12.85	12.50	
3	—	12.40	12.30	13	13.10	—		23	—	12.50	
4	13.15	12.40	—	14	13.05	—		24	12.85	12.65	
5	13.35	12.45	12.30	15	12.95	12.50		25	12.80	12.55	
6	13.35	12.40	—	16	—	12.60		26	12.70	12.50	
7	13.35	—	12.50	17	12.95	12.60		27	12.65	12.50	
8	13.40	12.35	12.40	18	13.05	12.55		28	12.55	—	
9	—	12.25		19	12.80	12.50		29	12.70	12.45	
10	13.20	12.40		20	12.85	12.50		30	—	12.45	
								31	—	12.45	

Average Monthly Price Per Pound

	1931 Cents	1932 Cents	1933 Cents	1934 Cents		1931 Cents	1932 Cents	1933 Cents	1934 Cents
Jan.	10.27	6.65	6.23	11.25	Aug. ...	7.21	7.43	9.55	13.40
Feb.	10.96	6.85	6.05	12.28	Sept. ...	6.52	6.30	9.64	13.00
Mar. ...	10.90	6.86	6.39	12.30	Oct. ...	6.32	6.30	9.58	12.48
Apr. ...	10.19	6.16	7.02	11.80	Nov. ...	6.44	6.22	10.04	
May ..	9.38	5.72	8.64	11.44	Dec. ...	6.25	6.00	10.17	
June ...	9.05	5.02	9.47	12.20	Average for				
July ...	9.28	5.87	10.76	12.84	Year ...	8.56	6.41	8.63	

World Stocks of Crude Rubber

ON HAND OR AFLOAT TO THE U. S.

At End of	ON HAND 1932	ON HAND 1933	ON HAND 1934	AFLOAT 1932	AFLOAT 1933	AFLOAT 1934	ON HAND AND AFLOAT 1932	ON HAND AND AFLOAT 1933	ON HAND AND AFLOAT 1934
Jan.	322,860	396,376	368,660	42,234	32,539	45,768	365,094	428,915	414,428
Feb.	318,936	381,794	357,094	51,728	32,898	53,063	370,604	414,692	410,157
Mar.	329,586	390,135	353,242	44,190	29,531	54,722	373,776	419,666	405,786
Apr.	336,957	382,167	351,981	40,387	30,745	56,251	377,344	412,912	408,232
May	336,719	364,623	351,329	50,453	43,342	57,921	387,172	407,965	409,250
June	334,657	333,954	358,149	43,079	63,608	46,698	377,736	397,562	404,847
July	333,729	326,609	364,883	37,894	57,435	45,869	371,623	384,044	410,752
Aug.	342,888	325,148	362,647	42,846	53,084	40,278	385,734	378,232	402,925
Sept.	346,154	334,637	359,667	46,188	57,255	38,831	342,342	391,892	398,498
Oct.	358,282	343,579		40,176	58,568		398,458	402,147	
Nov.	360,386	353,852		40,879	57,140		401,265	410,992	
Dec.	379,000	364,541		38,360	55,606		417,360	419,147	

(Rubber Manufacturers' Association figures raised to 100%)

STOCKS IN GREAT BRITAIN

Stocks in London

(No. of Tons in Wharves and Warehouses, including Latex)

At end of	1932	1933	1934	At end of	1932	1933	1934
Jan.	67,166	36,481	38,570	July	48,842	41,178	50,490
Feb.	65,942	37,182	38,752	Aug.	47,079	39,480	48,953
Mar.	64,280	40,689	40,501	Sept.	44,942	39,237	56,103
Apr.	61,848	40,911	42,413	Oct.	42,327	37,101	
May	56,089	41,998	42,190	Nov.	40,606	36,139	
June	51,009	43,032	45,674	Dec.	37,407	35,615	

At End of Recent Weeks

	First Saturday	Second Saturday	Third Saturday	Fourth Saturday	Fifth Saturday
1934					
April	40,994	41,458	41,589	42,539	
May	41,815	42,908	41,900	42,118	
June	42,503	43,308	43,709	44,157	45,711
July	47,607	48,908	49,654	49,834	
Aug.	50,860	51,555	51,640	51,362	
Sept.	48,255	50,028	52,320	53,924	56,030
Oct.	57,272	59,469	61,043	62,058	

Stocks in Liverpool

1934				
April	54,464	53,832	54,119	53,917	
May	53,915	54,268	54,123	54,276	
June	54,103	54,294	54,327	54,228	54,161
July	54,966	55,141	55,749	55,556	
Aug.	55,467	55,681	55,757	56,343	
Sept.	56,383	58,006	58,182	59,028	57,477
Oct.	54,944	55,266	57,414	57,944	

STOCKS IN PENANG AND SINGAPORE

(Stocks held by Dealers—Quantities in Long Tons)

End of	1931	1932	1933	1934	End of	1931	1932	1933	1934
Jan.	48,802	48,850	22,525	40,405	July	51,203	17,017	36,972	65,099
Feb.	49,283	46,954	21,530	41,884	Aug.	48,971	20,649	38,601	
Mar.	49,590	46,591	24,594	47,933	Sept.	47,025	20,415	36,948	
Apr.	45,868	39,663	25,460	48,431	Oct.	52,132	23,158	37,282	
May	44,278	38,690	29,822	76,393	Nov.	46,947	25,419	39,018	
June	47,517	19,770	34,676	73,218	Dec.	45,795	25,341	38,269	

STOCKS IN OTHER CENTRES

End of:	Malaya Mainland	Afloat for Europe	Holland	Colombo	Para and Manaos
1933					
July	35,020	22,900	1,007	3,208	3,830
Aug.	36,756	22,000	1,033	3,411	3,588
Sept.	36,083	25,900	1,107	4,286	3,288
Oct.	37,302	28,320	1,411	4,889	3,237
Nov.	36,965	38,530	1,285	5,575	3,383
Dec.	38,441	36,700	1,052	5,792	2,981
Jan., 1934	36,788	39,250	1,115	7,271	3,305
Feb.	39,630	36,563	906	5,366	3,420
Mar.	37,275	33,365	904	4,083	3,519
Apr.	33,765	32,640	905	4,070	3,624
May	7,213	39,370	897	3,066	3,556
June	20,243	36,870	902	3,533	3,273
July	27,235	35,430	1,263	4,683	3,094
August	30,507	35,000	1,322	5,713	2,849
Sept.	33,661	35,000			3,075

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total		Total		Total
1924	21,863,311	1928	24,247,282	1932	6,261,336
1925	26,001,664	1929	24,141,502	1933	8,713,962
1926	24,199,524	1930	17,364,096	1934	.....
1927	19,700,003	1931	11,253,800	1935	.....
1934:		1934:		1934:	
January	789,274	May	1,140,132	September	526,472
February	1,262,311	June	1,015,730	October	629,878
March	1,651,548	July	1,155,024	November	.....
April	1,635,722	August	752,074	December	.....

U. S. Tire and Tube Statistics[1]

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Figures for Recent Years

	1926	1927	1928	1929	1930	1931	1932	1933
Production	61,237	64,439	77,944	68,726	50,965	48,739	40,085	45,304
Shipments	59,002	64,059	74,296	69,395	53,638	48,151	40,260	44,094
Inventory[2]	10,456	10,264	13,624	11,838	9,003	7,775	7,644	8,888

Figures for Recent Months

	PRODUCTION 1932	1933	1934	SHIPMENTS 1932	1933	1934	INVENTORY 1932	1933	1934
Jan.	3,462	2,258	3,922	3,253	2,597	3,222	7,912	7,237	9,684
Feb.	3,871	2,339	4,335	2,553	2,292	3,285	9,172	7,377	10,725
Mar.	3,671	2,038	5,180	2,954	2,092	4,223	9,878	7,290	11,651
Apr.	3,517	3,123	4,470	3,698	3,654	4,438	9,846	6,778	11,981
May	3,820	5,189	4,456	4,258	5,180	5,332	9,379	6,760	11,127
June	5,643	6,100	4,342	10,065	6,305	5,228	4,999	6,615	10,219
July	3,617	5,714	3,353	2,404	5,497	4,157	6,203	6,844	9,437
Aug.	3,089	4,994	3,533	2,655	4,707	4,308	6,659	7,070	8,697
Sept.	2,539	3,999		3,082	3,503		6,096	7,595	
Oct.	2,569	3,429		1,799	2,537		6,876	8,462	
Nov.	2,304	3,039		1,711	2,197		7,454	9,247	
Dec.	1,983	3,082		1,819	3,531		7,644	8,888	

AUTOMOBILE INNER TUBES

Figures for Recent Years

	1926	1927	1928	1929	1930	1931	1932	1933
Production	76,618	70,823	80,180	68,829	52,420	48,333	36,891	42,546
Shipments	71,591	72,896	77,127	70,592	54,938	50,021	37,911	41,391
Inventory[2]	16,200	13,692	16,117	12,807	9,999	7,922	6,749	7,815

Figures for Recent Months

	PRODUCTION 1932	1933	1934	SHIPMENTS 1932	1933	1934	INVENTORY 1932	1933	1934
Jan.	3,308	2,093	3,530	3,529	2,535	3,199	7,719	6,197	8,403
Feb.	3,281	2,224	4,077	2,728	2,102	3,323	8,760	6,357	8,445
Mar.	3,502	1,883	5,194	2,686	1,902	4,118	9,448	6,369	10,244
Apr.	3,225	2,853	4,735	3,385	3,051	4,342	9,441	6,189	10,585
May	3,820	5,189	4,359	4,258	5,180	4,902	9,379	6,760	10,043
June	5,279	5,448	4,097	9,019	5,778	5,309	5,174	6,097	8,795
July	2,937	5,603	3,531	2,160	5,211	4,323	5,975	6,440	8,053
Aug.	2,748	4,916	3,680	2,503	4,687	4,198	6,127	6,628	7,555
Sept.	2,601	3,827		3,098	3,472		5,753	7,008	
Oct.	2,187	3,506		1,658	2,676		6,214	7,831	
Nov.	2,005	2,863		1,578	2,103		6,662	8,625	
Dec.	1,779	2,631		1,724	3,410		6,749	7,815	

(1) Rubber Manufacturers' Association figures, raised to 100%. The Association estimates its figures to be 75% complete up until 1929 and 80% complete for 1929-1933. Beginning 1934, the Association reported its figures to be 97% complete.

(2) Held by manufacturers at end of period indicated.

Automobile Production

	United States Total	Passenger Cars	Trucks	Canada Total	Passenger Cars	Trucks	Grand Total
1928	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933*	1,920,057	1,573,512	346,545	65,924	53,855	12,069	1,992,126
1933*							
Aug.*	232,855	191,414	41,441	6,079	4,919	1,160	238,934
Sept.*	191,800	157,376	34,424	5,808	4,358	1,450	197,608
Oct.*	134,683	104,870	29,813	3,682	2,723	959	138,365
Nov.*	60,683	42,365	18,318	2,291	1,503	788	62,974
Dec.*	80,565	50,789	29,776	3,262	2,171	1,091	83,827
1934							
Jan*	156,907	113,652	43,255	6,904	4,946	1,958	153,811
Feb.*	231,707	187,666	44,041	8,571	7,101	1,470	240,278
Mar.*	331,263	274,738	56,625	14,180	12,272	1,908	345,443
Apr.*	354,745	289,031	65,714	18,363	15,451	2,912	373,108
May*	331,652	273,765	57,887	20,161	16,504	3,657	351,813
June*	308,065	261,852	46,213	13,905	10,810	3,095	321,970
July*	266,576	223,868	42,708	11,114	8,407	2,707	277,690
August	234,809	183,500	51,309	9,904	7,325	2,579	244,713
Sept.	168,872	123,909	44,963	5,579	4,211	1,368	174,451

* Revised.

Exports of Crude Rubber from Principal Producing Countries

(*Long Tons*)

	BRITISH MALAYA [1]								DUTCH EAST INDIES [5]						
	Gross Exports	Imports	Gross Exports Minus Imports	Ceylon [2]	India & Burma [3]	Sarawak [4]	British North Borneo [5]	Siam [4]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Indo-China [3]	Amazon Valley	All Other [6]	World Total [7]
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,415
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	514,487
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,530
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,970	10,782	10,309	6,781	4,251	69,755	79,396	115,254	7,665	14,260	5,651	814,241
1931	519,740	125,506	394,234	61,769	8,470	10,451	6,247	4,218	75,952	87,747	116,009	11,696	12,121	3,292	792,203
1932	478,252	92,539	385,713	48,973	3,888	6,960	4,664	3,451	61,312	79,837	85,871	13,883	6,450	1,816	702,818
1933:															
Jan.	46,599	7,857	38,742	4,602	318	590	458	305	4,766	5,630	6,840	1,957	554	125*	58,887
Feb.	37,564	6,167	31,397	5,064	304	541	458	368	4,895	5,119	6,081	895	620	125*	55,867
Mar.	42,059	7,964	34,095	4,905	389	571	458	304	5,092	6,466	6,999	1,102	995	125*	61,501
Apr.	36,752	7,758	28,994	4,582	272	624	583	235	5,226	5,969	8,147	1,122	556	125*	56,435
May	42,902	13,664	29,238	4,643	475	1,091	583	359	6,782	7,298	13,195	1,371	918	125*	66,078
June	41,411	16,538	24,873	5,198	377	1,149	582	632	7,352	6,654	14,779	1,369	704	125*	63,794
July	50,531	18,772	31,759	4,201	270	1,358	728	797	7,367	8,580	16,534	1,310	913	125*	73,942
Aug.	52,266	17,869	34,397	5,839	246	955	728	926	6,460	7,985	15,161	808	1,116	125*	74,746
Sept.	49,607	15,146	34,461	5,111	125	1,027	728	611	5,868	9,164	15,005	1,702	656	125*	74,455
Oct.	61,002	17,390	43,612	5,674	271	959	750	979	6,329	8,682	15,170	1,513	965	125*	84,879
Nov.	54,599	20,142	34,457	6,097	516	1,020	750	1,191	6,684	9,951	14,474	1,599	956	125*	77,820
Dec.	57,579	18,110	39,469	7,062	964	989	978	1,046	7,030	10,183	17,274	2,173	930	125*	88,223
1934:															
Jan.	55,055	21,184	33,871	7,551	1,531	1,197	805	1,290	6,513	8,974	17,718	2,158	576	125*	82,309
Feb.	57,867	19,688	38,179	8,354	775	1,005	805	1,264	6,706	10,277	17,466	1,100	831	125*	86,887
Mar.	58,515	26,470	32,045	6,954	1,412	1,360	806	1,363	8,655	12,043	25,064	1,316	846	125*	91,989
Apr.	56,748	27,963	28,785	5,783	762	1,447	894	1,311	7,282	11,324	24,054	1,519	440	125*	83,726
May	69,403	34,093	35,310	7,528	1,106	1,892	1,397	997	12,104	16,720	34,710	1,408	726	125*	114,023
June	53,282	20,981	32,301	3,305	1,425	1,886	644	1,497	4,860	6,078	15,216	1,504	765	125*	69,606
July	53,335	22,829	30,506	4,093	710	1,662	1,048	2,399	5,762	7,408	14,182	1,703	353	125*	69,951
Aug.	52,641	17,865	34,776	5,369	552	1,714	1,048	1,908	5,340	8,902	10,902	1,610	710	125*	72,956
Sept.	61,051	17,889	43,162	6,632		1,438	839	1,626	5,722	10,738	14,688	1,665	764	125*	
Oct.	47,045	10,226	36,819	6,918											

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, 2,439 in 1927, 1,437 in 1928, 2,670 in 1929, and 1,274 in 1930. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments were equivalent to 18 tons in 1923, 93 tons in 1924, 6 tons in 1925, 20 tons in 1926, about ½ ton in 1927, and 1 ton in 1928, and practically none in 1929, 1930 and 1931. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons in 1924, 2,239 tons in 1925, 44 tons in 1926, 84 tons in 1927, 1,459 tons in 1928, 1,302 tons in 1929, and 2,656 tons in 1930. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands, and includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. * Figure is provisional; final figure will be shown when available.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(*Long Tons*)

	United States [1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	238,407	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	343,808
1920	249,530	56,844	13,88b	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,620
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	—3,807	1,778	589	567	396,222
1923	301,527	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,178	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,299	1,870	617,957
1927	403,472	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,846	36.49b	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,275	35,453	24,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	894,638
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,2b1	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	45,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1933	398,365	73,335	61,953	54,120	19,332	66,831	19,341	29,830	13,534	11,166	1,245	7,831	5,520	10,402	.....
1933:															
June	22,228	8,739	4,056	3,639	1,441	3,330	1,997	2,000	613	469	—519	772	541	400	49,706
July	43,824	3,961	3,774	4,103	1,192	1,460	1,146	2,952	2,347	299	16	486	435	287	66,283
Aug.	43,208	4,330	5,251	4,193	1,795	4,424	1,249	3,312	1,500	325	209	616	606	2,759	73,779
Sept.	43,886	4,341	4,111	5,841	2,620	5,369	2,055	2,168	794	864	189	604	790	577	74,211
Oct.	43,366	3,373	4,921	4,772	2,580	6,150	1,836	2,084	604	1,118	310	777	441	686	73,081
Nov.	39,633	3,955	5,419	4,086	2,184	6,296	942	4,483	301	1,129	222	878	493	882	70,903
Dec.	38,864	6,524	5,415	4,933	1,773	6,865	1,029	2,400	190	1,360	213	703	776	1,772	72,817
1934:															
Jan.	47,114	9,503	6,472	6,057	1,721	5,628	2,517	2,749	566	2,173	381	1,185	484	1,355	88,276
Feb.	33,087	10,785	5,301	5,490	1,854	4,570	2,388	3,399	950	1,538	287	464	656	516	73,357
Mar.	39,306	14,008	4,980	6,453	3,411	5,655	1,394	4,018	671	965	284	836	394	976	86,242
Apr.	42,262	9,999	3,210	6,701	2,419	5,679	1,966	1,326	415	504	262	1,217	752	465	77,177
May	47,412	9,786	3,634	6,499	2,218	6,905	2,218	4,360	769	214	322	940	147	1,768	87,192
June	46,785	16,564	3,803	6,171	2,208	6,745	1,887	3,145	1,512	837	331	843	1,146	1,624	93,601
July	40,308	12,266	4,051	5,494	2,430	5,739	708	1,640	732	810	540	1,602	747	1,094	78,161
Aug.	31,405	13,728	3,774	3,078	1,948	4,945	1,795		658	669	239	1,033	277	1,519	
Sept.	30,345	11,254			2,770				743		339	980			

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1] United States imports of guayule are included in this compilation. * Figure is provisional; final figure will be shown immediately it becomes available.

A Section Devoted to Listings of Leading Producers and Distributors of Raw Materials, Machinery and Equipment, and Supplies for the Rubber Industry.

The Market Place

Chemicals and Compounding Materials — Machinery and Equipment—Crude, Reclaimed and Scrap Rubber—Fabrics—Rubber Products — Consulting Engineers.

Chemicals and Compounding Materials —

ACCELERATORS—
Ureka C—Ureka Blend B—Ureka.—A-1, A-7, A-11, A-16, A-19, A-22, Z-88, A-510, DPG
ANTIOXIDANTS — Flectol A, Oxynone
The RUBBER SERVICE Laboratories Co.
611 Peoples Sav. & Trust Bldg., Akron, O.
A Division of MONSANTO Chemical Wks.

ALUMINUM FLAKE
A uniform, fine, low gravity, white reinforcing pigment. *Furnished to the rubber trade for 25 years.*
The Aluminum Flake Co.
Akron, Ohio

ANTIMONY Pentasulphide, golden and crimson, very fine, pure.
Rare Metal Products Co.
Belleville, N. J.
Direct Factory Representation

ASBESTINE—Specially prepared for use in Rubber. Send for liberal working samples.
SOLE PRODUCERS
International Pulp Co.
41 Park Row New York City

CALCENE— The Ideal low gravity, white reinforcing pigment. Gives high tensile and elongation properties with exceptionally good resistance to tear and abrasion.
The Columbia Alkali Corporation
BARBERTON, OHIO

CARBON BLACK— *Micronex*
the world's standard gas black, universally known as the "King of Rubber Pigments."
Binney & Smith Co.
41 East 42nd St. New York City

CABOT CERTIFIED CARBON BLACK
"Spheron"
Godfrey L. Cabot, Inc.
77 Franklin St. Boston, Mass.

IN this section are listed the products of the leading producers of materials and equipment used by rubber manufacturers.

When buyers refer to these pages for their needs, your name and address and a description of your products should be available here. The cost of a one-inch listing is only $5.00 per issue—the lowest cost of advertising space available in the rubber field.

THE RUBBER AGE
250 West 57th St., New York

CARBON BLACK— *Aerfloted*
Arrow Black for rubber compounding. Standard for grit-free uniformity.
J. M. Huber, Inc.
460 West 34th St. New York

CARBON BLACK
SUPREME—*the up-to-date standard for rubber*
Imperial Oil & Gas Products Co.
Union Bank Bldg., Pittsburgh, Pa.

CARBON BLACK
DIXIE...KOSMOS
Used throughout the world
UNITED CARBON COMPANY
Charleston, W. Va.
New York • Akron • Chicago

CARBON BLACK
DISPERSO . . . *the specially developed Carbon Black that gives* BETTER DISPERSION.
WISHNICK-TUMPEER, INC.
251 Front Street New York

CATALPO—The universal and standard rubber pigment now being used in treads, solids, tubes, carcass frictions, etc.
Moore & Munger
33 Rector Street, New York City

CHEMICALS
For Rubber — For Industry Generally
Accelerators — *Acids* — *Latex*
Antioxidants — *Oil of Myrbane* — *Lotol*
Specialties — *Aniline Oil* — *Dispersions*
The Naugatuck Chemical Co.
1790 BROADWAY NEW YORK

CHEMICALS and compounding ingredients; Clay, Accelerators, Mineral Rubber.
R. T. Vanderbilt Co.
230 Park Ave. New York City

CHEMICALS and Mineral Ingredients—Whiting, Clay, Talc, Barytes, Colors. Heavy Calcined Magnesia. Carbonate of Magnesia, Pumice Stone.
Standard Since 1890
Whittaker, Clark & Daniels, Inc.
245 Front St., New York

COLLOIDAL SULPHUR
COLLOIDAL ZINC OXIDE
COLLOIDAL COLORS
Heveatex Corporation
78 Goodyear Ave., Melrose, Mass.
Offices in New York, Akron, Chicago

COLORS—*for Rubber*
Fine organic colors—Reds, Blues, Oranges, Violets, Greens—or any shade to meet your requirements—also Rubber Dispersed Colors
Ansbacher-Siegle Corporation
Rosebank, Staten Island, N. Y.
820 So. Clinton St., Chicago, Ill.
Agents in Principal Cities

COLORS
BRILLIANT ORGANIC DYES; PERMANENT, NON-BLEEDING, LOW COST For All Cures
The RUBBER SERVICE LABORATORIES CO.
611 Peoples Savings & Trust Bldg.
Akron, Ohio

CUMAR—Paracumarone Resin.
A neutral gum for rubber compounding.
Samples and prices on request.
The Barrett Company
40 Rector St. New York City